GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN

Kommadi, Madhurawada, Visakhapatnam - 530 048

(Approved by AICTE, New Delhi, Affiliated to Andhra University, Visakhapatnam)

(Accredited by National Board of Accreditation [NBA] for B.Tech CSE, ECE and IT - valid from 2019-22 and 2022-25)

(ACCREDITED BY NATIONAL BOARD OF ACCREDITATION[NBA] FOR B.TECH EEE VALID FROM 2023-24 TO 2025-2026)

(Accredited by National Assesment and Accreditation Council [NAAC] with A Grade- valid from 2022-27)

(Phone: +91-891-2739144, 2739124, 2719125, 2719127 Email Id: gvpcew@gmail.com , info@gvpcew.ac.in)

1.1.1 - Curricula developed and implemented have relevance to the local, national, regional and global developmental needs which are reflected in Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and Course Outcomes (COs) of the various Programmes offered by the Institution.

Curricula developed and implemented by the institution are aligned with local, regional, national, and global developmental needs. This alignment is reflected through the Programme Outcomes (POs) and Course Outcomes (COs) of the programmes offered. The curriculum is developed with active involvement of all stakeholders to ensure that the needs of society at various levels local, national, regional, and global are addressed. All programmes offered by the Institute follow an outcome-based approach, ensuring social and industrial relevance while meeting evolving market requirements. The curriculum design process for each programme adheres to the flow-chart shown in Fig. 1.

To achieve the Mission and Vision of the Institute and the respective Departments, Program Specific Outcomes (PSOs), Programme Outcomes (POs), and Course Outcomes (COs) are formulated with contributions from faculty members. Programme Outcomes are framed based on the graduate attributes defined under the Washington Accord. As per the guidelines of NAAC, AICTE and UGC, courses are categorized into fundamental subjects such as Basic sciences and Engineering, along with discipline-specific advanced courses. The curriculum also offers flexibility by allowing students to choose courses from Professional Electives and Open Electives. Course Outcomes of all courses are systematically mapped to the POs and PSOs of the programme.

The curriculum is reviewed and discussed in Board of Studies (BoS) meetings, which include experts from academia, industry, alumni, and department faculty. Suggestions from the experts are incorporated into the final version of the curriculum, which is then approved by the Academic Council and Governing Body for implementation. At the end of each semester, feedback is collected from students through course-end surveys. Any suggestions received are consolidated, reviewed, and considered for revisions in the subsequent (Board of Studies) BoS meeting.

The following are some of the features of the curriculum offered in the Institute relevant to the local, national, regional and global development needs:

A) CURRICULA RELEVANCE TO THE LOCAL NEEDS

The following components were introduced in the Curricula

- Courses offered by Andhra Pradesh State Skill Development Corporation (APSSDC) are floated as Skill Oriented Courses (SOCs) in curricula.

- Introduction of 3-Week induction program for the first year students, Lateral entry students at the time of joining the Institute.
- All programs have Internships during break between semesters for 2nd,3rd ,4th Years.
- All programmes have Projects in final semester
- Design Thinking & Innovation is introduced in all programmes.

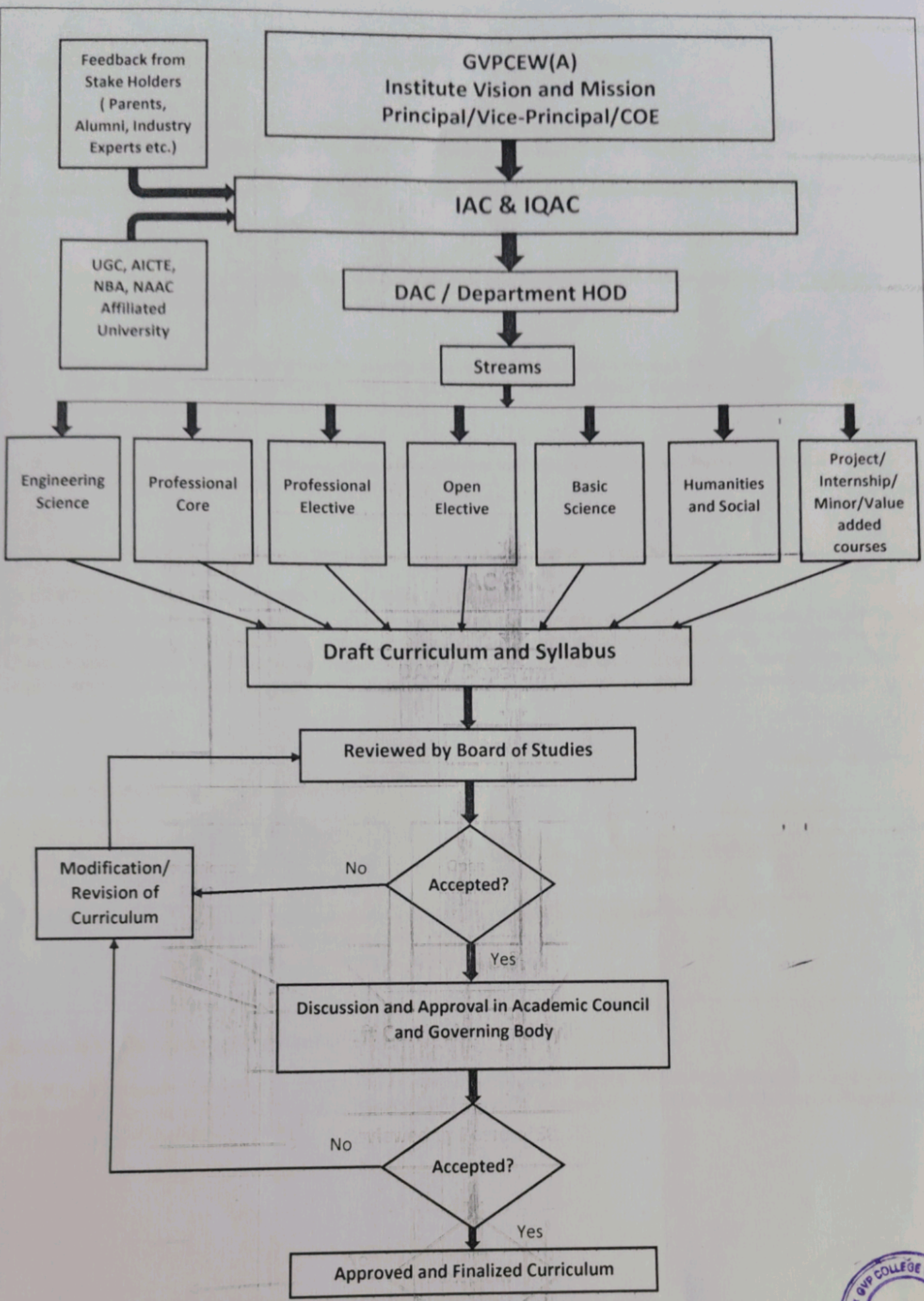


Figure 1:Flowchart for the Curriculum Design and Development

B) CURRICULA RELEVANCE TO THE NATIONAL/ REGIONAL NEEDS

Changes made to meet national requirements based on guidelines from bodies like MHRD, AICTE, UGC, NAAC, and NBA. The curriculum was updated according to the model curriculum suggested by AICTE.

The students are encouraged to enroll in MOOCs through NPTEL. Many students have obtained SWAYAM-NPTEL certificates.

- Introduction of the new courses like Data Science, Machine Learning, Social Media Analytics, Software Metrics in B.Tech programmes.

- Conducting Value added programs by experts from reputed organizations through MoUs like ICT Academy, CEMS, BSNL, CODE THANTHRA, EDUSKILLS, CODE VITA included "Constitution of India" for guiding ethical engineering practices and societal Impact.

- In the B.Tech program , the cross cutting issues relevant to professional ethics and human values and environmental sustainability into the curriculam.

- Social Activity is introduced to foster the activities NSS was started in Year 2011.

C) CURRICULA RELEVANCE TO THE GLOBAL NEEDS·

To provide Global carrier opportunities Programmes like Computer Networks, Blockchain Technologies, PCB Designing, Wire less Technologies and Minors in Computer Science and Engineering introduced, English dept. offers Professional Communication & Soft Skills Lab in all programmes. The Gayatri Vidya Parishad College of Engineering develops and implements all the courses in the programs to align with local, regional, national, and global developmental needs.

Some courses introduced to meet the relevance

NEED	Name of the Courses offered
Local	Skill Oriented Courses IOT, Python Programming, Engineering Workshop
National / Regional	Wireless Communications (ECE)/Design thinking and innovations
Global	Artificial Intelligence and Machine Learning (CSE) Computer Networks (IT) Electrical Safety Management (EEE) VLSI Design& Embedded System (ECE)

Reflection Of The Curricula Relevance In The Pos And Cos :

All B.Tech. programs The curricula was developed and implementing as per the OBE format. Some courses relevance to the local, regional, national, and global developmental needs, which is reflected in the POs and COs here with attaching the co po attainment sheet give below

Course Objectives:

Mathematics- III						
Regulation	Branch	Year	Sem	Subject code	CO No.	Course Outcome
R20	ECE	2	1	R2021011	CO1	Interpret the physical meaning of vector differential operators and evaluate line, surface and volume integrals using Vector Integral theorems.
R20	ECE	2	1	R2021011	CO2	Find the Laplace Transform of various functions and Apply it for solving differential equations
R20	ECE	2	1	R2021011	CO3	Find the Fourier Series of periodic signals and Apply Fourier Integral theorem to find Fourier transform to a range of non-periodic waveforms.
R20	ECE	2	1	R2021011	CO4	Solve the linear and non-linear partial differential equations of first order.
R20	ECE	2	1	R2021011	CO5	Solve higher order linear partial differential equations with constant coefficients and utilize the method of separation of variables to solve one dimensional wave, heat and two-dimensional Laplace equations

Program Outcomes:

PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO12	PSO 1	PSO2
3	2	-	-	-	-	-	-	-	-	-	2	-	-
3	2	-	-	-	-	-	-	-	-	-	2	-	-
3	2	-	-	-	-	-	-	-	-	-	2	-	-
3	2	-	-	-	-	-	-	-	-	-	2	-	-
3	2	-	-	-	-	-	-	-	-	-	2	-	-
3	2										2		

PO#	Overall POs & PSOs Attainment of 2021 batch			
	Direct Attainment	Direct Attainment (80%)	Indirect attainment (20%)	overall PO attainment
PO1	1.52	1.22	0.27	**1.49**
PO2	1.57	1.26	0.28	**1.54**
PO3	1.55	1.24	0.28	**1.52**
PO4	1.64	1.32	0.30	**1.62**
PO5	1.81	1.45	0.33	**1.78**
PO6	1.41	1.13	0.25	**1.38**
PO7	1.33	1.07	0.24	**1.31**
PO8	1.86	1.49	0.32	**1.81**
PO9	1.87	1.50	0.34	**1.84**
PO10	2	1.60	0.34	**1.94**
PO11	1.31	1.05	0.24	**1.29**
PO12	1.56	1.25	0.28	**1.53**
PSO1	1.58	1.27	0.28	**1.55**
PSO2	1.53	1.23	0.28	**1.51**

Indirect Assessment (2021 batch)

PO#	POs/PSOs	Exit survey	Alumni Survey	Employer survey	Parent survey	Indirect attainment (20%)
PO1	Engineering Knowledge	3.35	3.26	2.00		2.63
PO2	Problem Analysis	3.37	3.20	2.00		2.94
PO3	Design/ Development of Solutions	3.35	3.26	2.00		2.97
PO4	Conduct investigations of complex problems to provide valid conclusions	3.35	3.26	2.00		2.97
PO5	Modern Tool Usage	3.27	3.26	2.00		2.96
PO6	The Engineer and Society	3.34	3.10	2.00		2.88
PO7	Environment and Sustainability	3.29	3.26	2.00		2.96
PO8	Ethics	3.35	3.53	2.00	3.00	3.19
PO9	Individual and Team Work	3.29	3.20	2.00		2.93
PO10	Communication	3.31	3.40	2.00	3.00	3.15
PO11	Project Management and Finance	3.29	3.56	2.00		3.11
PO12	Life-long Learning	3.37	3.33	2.00		3.00
PSO1	Acquire knowledge required for designing Electronics and Communication systems.	3.42	3.33	2.00		3.01
PSO2	Design, simulate and implement essential modules in the areas of Electronic circuits, VLSI, Embedded systems, Communication and Signal processing.	3.41	3.23	2.00		2.96

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INTERNAL QUALITY ASSURANCE CELL (IQAC)

IQAC/1/2024-2025 Date:01.07.2024

Minutes of Meeting

Minutes of Meeting held on 01.07.2024
Venue: Seminar hall **Time:** 3:30PM

Agenda:
1. Activity Plan for the Academic year 2024-2025
2. Activities related to Autonomous Status
3. Consideration of DAC report

The meeting started with a brief note of welcome by the chairman, IQAC

Item No.1
Activity Plan for the Academic year 2024-2025
Resolution No.1
It was decided to plan academic calendar and activities in line with the academic calendars of affiliating universities-JNTUK, Kakinada and Andhra University, Visakhapatnam.

Item No.2
Activities related to Autonomous Status
Resolution No.2
(i) Form an Academic council in line with the guidelines of UGC
(ii)IQAC resolved to finalize the academic rules and regulations for presentation and approval by the academic council.
(iii)Finalize the list of possible BOS members for approval by academic council.

Item No.3
Consideration of DAC report
Resolution No.3
The IQAC considered the reports submitted by the Department Advisory Committees (DACs) of all departments and, after due deliberation, resolved the following:
(i)The possible course structure for the First-year students under autonomous stream.
(ii)The elective courses to be opted in Third and Fourth year for students of Andhra university and JNTUK.

Coordinator

Chairman, IQAC

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INTERNAL QUALITY ASSURANCE CELL (IQAC)

The following members attended the IQAC meeting at 3:30PM on 01-07-2024 in seminar hall.

Members Present

S.No	NAME	DESIGNATION
1	Dr. Raj Kumar Goswami	Chairman- Principal
2	Dr. G. Sudheer	Member- Vice Principal
3	Dr. M. Mani kumari	Member, Assistant Professor, ECE
4	Dr. K. P. Naidu	Member, Assistant Professor, CSE (AI &ML)
5	Ms. B. Bharathi	Member, Assistant Professor, BSH (Mathematics)
6	Ms Ch Sirisha	Member, Assistant Professor, ECE
7	Dr. M. Krishna	Member, Assistant Professor, EEE
8	Ms.P.Abhilasha	Alumni Member
9	Dr.K.L.Sai Prasad	HOD-BSH
10	Dr.P.V.S.L.Jagadamba	HOD-CSE
11	Dr.P.M.K.Prasad	HOD-ECE
12	Dr.R.V.S.Lakshmi Kumari	HOD-EEE
13	Dr.D.K.Bebarta	HOD-CSE (AI & ML)
14	Dr.M.Bhanu Sridhar	HOD-IT
15	Dr.P.Devendra	Member Coordinator, Associate Professor, EEE

Coordinator

Chairman, IQAC

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INTERNAL QUALITY ASSURANCE CELL (IQAC)

IQAC/2/2024-2025 Date:30.07.2024

Minutes of Meeting

Minutes of Meeting held on 30.07.2024
Venue: Seminar hall **Time:** 3:30PM

Agenda:
1. Circulation of Rules and Regulations R24
2. Submission of Draft Course Structure and Syllabus for B.Tech and M.Tech 1st Year under the Autonomous stream.
3. Formation of guidelines for conduct of BOS meeting

The meeting started with a brief note of welcome by the chairman IQAC

Item No.1
Circulation of Rules and Regulations R24
Resolution No.1
It was resolved to widely disseminate the approved Academic Rules and Regulations R24 framed for the autonomous stream.

Item No.2
Submission of Draft Course Structure and Syllabus for B.Tech and M.Tech 1st Year under the Autonomous stream.
Resolution No.2
After confirming that the draft course structure and syllabus of all departments aligns with the guidelines of AICTE, APSCHE, Affiliating University and the Vision and Mission of the institute, the IQAC resolved to forward the same to the respective Boards of Studies (BoS) for their recommendations.

Item No.3
Formation of guidelines for conduct of BOS meeting
Resolution No.3
The IQAC resolved to conduct the forthcoming First BOS meeting of all departments in hybrid mode to ensure wider participation of external experts and members who are unable to attend physically. Further, the necessary arrangements to be made have been approved.

Coordinator

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INTERNAL QUALITY ASSURANCE CELL (IQAC)

The following members attended the IQAC meeting at 3:30PM on 30-07-2024 in seminar hall.

Members Present

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1	Dr. Raj Kumar Goswami	Chairman- Principal
2	Dr. G. Sudheer	Member- Vice Principal
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9	Ms.P.Abhilasha	Alumni Member
10	Dr.K.L.Sai Prasad	HOD-BSH
11	Dr.P.M.K.Prasad	HOD-ECE
12	Dr.R.V.S.Lakshmi Kumari	HOD-EEE
13	Dr.D.K.Bebarta	HOD-CSE (AI & ML)
14	Dr.M.Bhanu Sridhar	HOD-IT
15	Dr.P.Devendra	Member Coordinator, Associate Professor, EEE

Coordinator

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INTERNAL QUALITY ASSURANCE CELL (IQAC)

IQAC/3/2024-2025 Date:07.10.2024

Minutes of Meeting

Minutes of Meeting held on 07.10.2024
Venue: Seminar hall **Time:** 3:30PM

Agenda:
1. Activities related to Autonomous Status.

The meeting started with a brief note of welcome by the chairman IQAC

Item No.1
Activities related to Autonomous Status.

Resolution No.1

(i) Resolved to make Minor changes in Academic rules and regulations R24 for B.Tech program as per the suggestions received during the first academic council meeting to stay in line with the guidelines of AICTE.

(ii) Resolved to incorporate the changes in the First-Year course structure and syllabus as per the suggestions provided in the First BoS meetings of the respective departments.

(iii) The IQAC intends to conduct FDPs based on the curriculum approved by BOS of different departments to improve the quality of teaching-learning process.

(iv) The IQAC has resolved to conduct the academic audit of all departments in the month of December.

(v) It was decided to conduct the second Academic Council meeting in hybrid mode to seek the approval of the changes made in (i) the Rules and Regulations (R24) and (ii) the syllabi of all departments.

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INTERNAL QUALITY ASSURANCE CELL (IQAC)

The following members attended the IQAC meeting at 3:30PM on 07-10-2024 in seminar hall.

Members Present

S.No	NAME	DESIGNATION
1	Dr. Raj Kumar Goswami	Chairman- Principal
2	Dr. G. Sudheer	Member- Vice Principal
3	Dr. K. P. Naidu	Member, Associate Professor, CSE (AI &ML)
4	Dr. N. Sharmili	Member, Professor, CSE
5	Ms. M. Deepthi	Member, Assistant Professor, IT
6	Ms. B. Bharathi	Member, Assistant Professor, BSH (Mathematics)
7	Ms Ch Sirisha	Member, Assistant Professor, ECE
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9	Mr. Seela Srikanth	Member, Accounts Manager
10	Ms.P.Abhilasha	Alumni Member
11	Dr.K.L.Sai Prasad	HOD-BSH
12	Dr.P.V.S.L.Jagadamba	HOD-CSE
13	Dr.P.M.K.Prasad	HOD-ECE
14	Dr.R.V.S.Lakshmi Kumari	HOD-EEE
15	Dr.D.K.Bebarta	HOD-CSE (AI & ML)
16	Dr.M.Bhanu Sridhar	HOD-IT
17	Dr.P.Devendra	Member Coordinator, Professor, EEE

Coordinator

Chairman, IQAC

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INTERNAL QUALITY ASSURANCE CELL (IQAC)

IQAC/4/2024-2025 Date:23.12.2024

Minutes of Meeting

Minutes of Meeting held on 23.12.2024
Venue: Seminar hall **Time**: 2:30PM

Agenda:
1. Approval of draft copy of AQAR 2023-2024.
2. Preparation of course structure and syllabus for the autonomous batch.

The meeting started with a brief note of welcome by the chairman IQAC

Item No.1
Approval of draft copy of AQAR 2023-2024.

The central coordinators of different criterion presented the data corresponding to each criterion.

Criterion 1	Dr.L.Ganesh and Ms.BVS Renuka devi
Criterion 2	Dr.ASV Vijayalakshmi
Criterion 3	Dr.V.Lakshmana Rao
Criterion 4	Dr.B.Vijaya Lakshmi
Criterion 5	Dr.T.Poornakantha
Criterion 6	Dr.K.L.Sai Prasad
Criterion 7	Dr.N.Sharmili

The suggestions put forward by the members of IQAC were incorporated in the document.

Resolution No.1
The IQAC approved the draft copy of AQAR for submission to NAAC.

Item No.2
Preparation of course structure and syllabus for the autonomous batch.
Resolution No.2
The IQAC advised all departments to prepare the course structure and syllabi for B.Tech II, III, and IV years, and M.Tech II year programs under the autonomous stream, in accordance with the AICTE Model Curriculum, APSCHE guidelines, NEP-2020 framework and as per industry requirements.

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EEE Course Accredited by NBA (2023-2026)

INTERNAL QUALITY ASSURANCE CELL (IQAC)

The following members attended the IQAC meeting at 2:30PM on 23-12-2024 in seminar hall.

Members Present

S.No	NAME	DESIGNATION
1	Dr. Raj Kumar Goswami	Chairman- Principal
2	Dr. G. Sudheer	Member- Vice Principal
3	Dr. M. Mani kumari	Member, Assistant Professor, ECE
4	Dr. K. P. Naidu	Member, Associate Professor, CSE (AI &ML)
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14	Dr.R.V.S.Lakshmi Kumari	HOD-EEE
15	Dr.D.K.Bebarta	HOD-CSE (AI & ML)
16	Dr.M.Bhanu Sridhar	HOD-IT
17	Dr.L.Ganesh	Special Invitee
18	Ms.BVS Renuka devi	Special Invitee
19	Dr.ASV Vijayalakshmi	Special Invitee
20	Dr.V.Lakshmana Rao	Special Invitee
21	Dr.B.Vijaya Lakshmi	Special Invitee
22	Dr.T.Poornakantha	Special Invitee
23	Dr.P.Devendra	Member Coordinator, Professor, EEE

Coordinator

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INTERNAL QUALITY ASSURANCE CELL (IQAC)

IQAC/5/2024-2025 Date:28.03.2025

Minutes of Meeting

Minutes of Meeting held on 28.03.2025
Venue: Seminar hall **Time:** 3:30PM

Agenda:
1. Submission of Draft Course Structure and Syllabus for the B.Tech II, III, and IV Years and M.Tech II year under the Autonomous stream
2. Formation of guidelines for conduct of Second BOS meeting.

The meeting started with a brief note of welcome by the chairman IQAC

Item No.1
Submission of Draft Course Structure and Syllabus for the B.Tech II, III, and IV Years and M.Tech II year under the Autonomous stream
Resolution No.1
After verifying that the course structure and syllabus of all departments align with the AICTE and APSCHE guidelines, the IQAC resolved to forward the draft copies to the respective Boards of Studies (BoS) for their suggestions and recommendations.

Item No.2
Formation of guidelines for conduct of Second BOS meeting.
Resolution No.2
The IQAC resolved to conduct the forthcoming second BOS meetings of all the departments in hybrid mode to ensure wider participation of external experts and members who are unable to attend physically.

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INTERNAL QUALITY ASSURANCE CELL (IQAC)

The following members attended the IQAC meeting at 3:30PM on 28-03-2025 in seminar hall.

Members Present

S.No	NAME	DESIGNATION
1	Dr. Raj Kumar Goswami	Chairman- Principal
2	Dr. G. Sudheer	Member- Vice Principal
3	Dr. M. Mani kumari	Member, Assistant Professor, ECE
4	Dr. K. P. Naidu	Member, Associate Professor, CSE (AI &ML)
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9	Dr. M. Krishna	Member, Assistant Professor, EEE
10	Mr. Seela Srikanth	Member, Accounts Manager
11	Ms.P.Abhilasha	Alumni Member
12	Dr.K.L.Sai Prasad	HOD-BSH
13	Dr.P.V.S.L.Jagadamba	HOD-CSE
14	Dr.P.M.K.Prasad	HOD-ECE
15	Dr.R.V.S.Lakshmi Kumari	HOD-EEE
16	Dr.D.K.Bebarta	HOD-CSE (AI & ML)
17	Dr.M.Bhanu Sridhar	HOD-IT
18	Dr.D.V.A.N.Ravi Kumar	Member Coordinator, Associate Professor, ECE

Coordinator

Chairman, IQAC

Principal
GVP College of Engineering for Women
Visakhapatnam-48.

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)
Madhurawada :: Visakhapatnam – 530048
(Approved by AICTE, New Delhi and Affiliated to Andhra University, Visakhapatnam)
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Accredited by NAAC with A Grade from 2022-2023 to 2027-2028

DEPARTMENT ADVISORY COMMITTEE (DAC) REPORT

Department of Basic Sciences & Humanities

For Proposed Autonomous Syllabus – Academic Year 2024–2025

The Department Advisory Committee (DAC) meeting was conducted on 16-07-2024 to review the *proposed* syllabus changes for the upcoming Autonomous Academic Year. The committee discussed observations received from subject faculty (English, Mathematics, Physics, Chemistry) and provided recommendations that will be placed before the Board of Studies (BoS) for final approval.

DAC Members :

Dr. K.L. Sai Prasad , Professor, HoD, BS&H
Dr.G. Sudheer, Professor, BS&H(Mathematics)
Dr.A. Suseelatha, Assistant Professor, First Year Coordinator, BS&H(Mathematics)
Dr.A. Kameswara Rao,Assistant Professor, BS&H(Mathematics)
Dr.V. Usha RamaniAssistant Professor, BS&H(English)
Dr.B. Rajesh BabuAssistant Professor, BS&H(Physics)
Dr.P. Srinivasa Rao, Assistant Professor, BS&H(Chemistry)
Mr.A. Srinivasa Rao, Assistant Professor, BS&H (Mechanical Engineering)
Dr.R. Neelima, Assistant Professor, BS&H(Management Science)

Agenda of the Meeting

- Review of proposed syllabus changes.
- Identification of additions/removals required in the Autonomous syllabus.
- Ensuring alignment with NEP 2020, Outcome-Based Education (OBE), and Programme Educational Objectives (PEOs).
- Recommendations for curriculum strengthening and resource requirements.
- Preparing the syllabus proposal for forwarding to the BoS

The Department Advisory Committee (DAC) reviewed the revised curriculum proposed for the upcoming academic year and carefully examined the additions and deletions made across various subjects under the Department of Basic Sciences and Humanities. After detailed discussions with subject experts, the committee recorded the following observations regarding the inclusion and removal of topics to enhance academic relevance, streamline course outcomes, and ensure alignment with current industry and technological requirements.

Subject	Topic Added/Removed	Reason/Justification
Physics	Removed: Hall effect	Repeated later in EDC and semiconductor subjects on the advice of ECE department.
	Removed: Magnetic materials	It was already covered in earlier academic levels.

Physics	Removed: Ultrasonics Nanophase materials	These topics are highly specialized and more suitable for advanced physics; removing them to reduces cognitive load for engineering first-years.
	Removed: Free electron theory of metals, Kronig - Penney model (qualitative treatment)	Better suited to specialized physics/electronics courses.
	Removed: Origin of energy band formation in solids, Classification of materials into conductors, semi conductors and insulators.	Repeated later in EDC and semiconductor subjects as per the suggestion of ECE Department.
	Added: Losses in optical fibres	Attenuation in optical fibers was added to introduce students to fundamental concepts in modern communication systems.
	Added: Quantum Computing	Quantum Computing was added to provide students early exposure to cutting-edge and future-oriented computing technologies."
Chemistry	Added: Electrochemical Sensors, Optical Fibre Applications	Ensures relevance to modern engineering fields like IoT, biomedical devices, and communication technologies.
	Supplementary (Not core): Next-gen catalysts, AI/ML in Green Chemistry, Circular Economy Principles	Kept as supplementary modules/seminars to expose students to modern trends without overburdening the first-year syllabus.
Mathematics	Added: Vector and Inner Product Spaces	Provides essential linear algebra foundation for AI-ML, data science, signal processing, and advanced engineering analysis.
	Removed: Fourier Series (for CSE & allied branches)	Advanced topic mainly required in signal processing and control systems
	Removed: Mass, Centre of Gravity, Moment/Product of Inertia	Branch-specific (Civil/Mechanical); not relevant for all engineering branches.
	Removed: Beta & Gamma Functions	Advanced functions with limited use in early engineering years.
	Removed: Euler's Theorem & Mean Value Theorems	Already covered at intermediate level; removing avoids redundancy.

Mathematics	Removed: Linear & Bernoulli Differential Equations	Covered in intermediate education; avoids repetition.
	Removed: Cauchy's Homogeneous LDE & LDELegendre's	Too advanced for first-year curriculum.
	Removed: Simultaneous Linear Differential Equations	Higher-level concept
	Removed: Gauss–Seidel Method	Numerical method taught in later Numerical Methods course.
	Removed: Area of curved surface, Mass, Moment of inertia etc.	Branch-specific applications; removed for uniformity across branches.
	Removed: Complex Matrices	Advanced linear algebra; introduced later.
	Removed: Cauchy's Linear Equation	Advanced topic suited for higher semesters.
	Removed: Legendre's Linear Equation	Applicable mainly in physics-oriented mathematics.
	Removed: Simultaneous Linear Differential Equations	Too advanced for first-year.
	Removed: Permutations & Combinations	Covered earlier at intermediate level.
	Removed: Boolean Algebra, Relations	Moved to Discrete Mathematics; avoids overlap.
	Removed: Modelling Computation	Advanced CSE topic; not needed in foundational year.
English	"English Wordsworth" software has been purchased .	To enhance listening comprehension and pronunciation.

DAC Suggestions

- Committee agreed with the rationalization of the syllabus to avoid duplication of topics studied at intermediate level.
- Supported branch-specific customization to ensure relevance.
- Recommended that application-oriented topics such as "Electrical Circuit Calculations" be expanded with engineering examples.
- Suggested confirming mathematical prerequisites for second-year courses before final deletion of any topic.

General Recommendations:

- Ensure CO–PO alignment for all subjects after syllabus restructuring.
- Avoid overloading first-year students by balancing advanced and foundational topics.
- Strengthen laboratory components wherever new applications or equipment are introduced.
- Provide orientation for faculty on NEP, OBE, and autonomous assessment structures.

Conclusion:

- The DAC reviewed the proposed Autonomous syllabus and provided the above recommendations. The Committee authorizes forwarding the revised and refined syllabus proposal to the Board of Studies (BoS) for further review and approval.

Members Present:

Sl.No.	Name	Signature
1	Dr.K.L.Sai Prasad	
2	Dr.G.Sudheer	
3	Dr.A.Suseelatha	
4	Dr.A.Kameswara Rao	
5	Dr.V.Usha Ramani	
6	Dr.B.Rajesh Babu	
7	Dr.P.Srinivasa Rao	
8	Mr.A.Srinivasa Rao	
9	Dr.R.Neelima	

HoD, BS&H

HEAD
DEPARTMENT OF
BASIC SCIENCES & HUMANITIES
GVP COLLEGE OF ENGINEERING FOR WOMEN
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DEPARTMENT ADVISORY COMMITTEE (DAC) REPORT

Department of Basic Sciences & Humanities

For Proposed II year Autonomous Syllabus (2025–2026)

The Department Advisory Committee (DAC) meeting was conducted on 26-03-2025 to review the proposed II year syllabus for the upcoming Autonomous academic year. The committee examined all BS&H-related courses—Management, Environmental Science, Professional Ethics & Human Values, Discrete Mathematical Structures, Probability & Statistics, Complex Variables & Statistical Methods, and Complex & Fourier Analysis—to ensure alignment with academic standards, regulatory guidelines, and student learning outcomes.

DAC Members :

Dr. K.L. Sai Prasad , Professor, HoD, BS&H
Dr.G. Sudheer, Professor, BS&H(Mathematics)
Dr.A. Suseelatha, Assistant Professor, First Year Coordinator, BS&H(Mathematics)
Dr.A. Kameswara Rao,Assistant Professor, BS&H(Mathematics)
Dr.V. Usha RamaniAssistant Professor, BS&H(English)
Dr.B. Rajesh BabuAssistant Professor, BS&H(Physics)
Dr.P. Srinivasa Rao, Assistant Professor, BS&H(Chemistry)
Mr.A. Srinivasa Rao, Assistant Professor, BS&H (Mechanical Engineering)
Dr.R. Neelima, Assistant Professor, BS&H(Management Science)

Agenda of the Meeting

- Review of proposed syllabus changes.
- Identification of additions/removals required in the Autonomous syllabus.
- Ensuring alignment with NEP 2020, Outcome-Based Education (OBE), and Programme Educational Objectives (PEOs).
- Recommendations for curriculum strengthening and resource requirements.
- Preparing the syllabus proposal for forwarding to the BoS

Observations:

After detailed evaluation of the newly framed syllabus, the DAC made the following common observations across all BS&H courses:

Subject	Topic Added/Removed	Action	Justification
Managerial Economics	Environmental Analysis	Removed	Overlaps with Environmental Science; removed to reduce non-core content load.
	Sales Promotion	Removed	Considered a management/marketing topic, not essential for engineering curriculum.
	Sales Forecasting	Removed	Advanced commerce topic not required for engineering outcomes; removed based on regulatory guidelines.
Environmental Science	Outcome-based components	Added	AICTE requires integration of sustainability outcomes and practical relevance in EVS.
Professional Ethics & Human Values	Outcome-based modules	Added	To align with AICTE's focus on ethical reasoning and professional responsibility.
Discrete Mathematical Structures	Counting Principles	Removed	Overlaps with Probability & Statistics; removed to avoid duplication.
	Boolean Algebra	Removed	Already covered in Digital Logic/Computer Organization courses on the advice of CSE Department.
	Modelling Computation	Removed	Excluded as they will learn in core syllabus on the advice of CSE Department.
	Chinese Remainder Theorem	Added	Valuable for security, algorithms, and number theory applications; industry-relevant (cryptography) based on inputs by CSE Department.
Probability & Statistics	Descriptive Statistics	Added	Needed for data analysis, machine learning readiness, and outcome-based learning based on inputs by CSE Department.
	Queuing Theory	Removed	Specialized operations research topic; reserved for higher electives on the advice of CSE Department.
	Negative Binomial Distribution	Removed	Less application in core engineering; simplifies course.
	Uniform & Exponential Distributions	Removed	Advanced statistical distributions; streamlined for clarity and manageable load.

Complex Variables & Statistical Methods (EEE)	Entire course introduction	Added	Enhances analytical skills for signal processing, control systems, and electrical design on the advice of EEE Department.
Complex & Fourier Analysis	Conformal Mapping	Removed	Advanced mathematical topic with limited direct engineering application; removed to prioritize essential concepts.
Operations Research	Demand Rate Uniform, Finite Production Rate	Removed	Reduces complexity; these EOQ variants have limited relevance for multidisciplinary engineering audiences.
	Sequencing	Added	Enhances practical industrial applicability; sequencing problems align with real-world scheduling, manufacturing, and service operations.

DAC Recommendations:

The Department Advisory Committee provides the following recommendations for implementation:

- The revised syllabus is appropriate for adoption under the Autonomous curriculum and aligns with NEP and OBE principles.
- Additions such as **Descriptive Statistics** and **Chinese Remainder Theorem** should be retained, as they enhance analytical and problem-solving skills.
- The removal of advanced or less essential topics (e.g., Conformal Mapping, Queuing Theory, redundant management topics) is appropriate and reduces cognitive load on students.
- Faculty are encouraged to supplement core subjects with seminars, guest lectures, and industry interactions to strengthen practical understanding.
- The introduction of **Complex Variables & Statistical Methods** for EEE students is well-justified and recommended for approval.
- AICTE-mandated course structures should be followed without deviation.
- The DAC approves the revised syllabus with the above recommendations and recommends forwarding it to the Board of Studies (BoS) for further processing.
- By removing the topics *"demand rate uniform"* and *"finite production rate"* and adding the topic *"Sequencing,"* the Operations Research course achieves better alignment with practical industrial applications and offers simplified, relevant content suitable for multi-disciplinary audiences.

General Recommendations:

- Ensure CO–PO alignment for all subjects after syllabus restructuring.
- Avoid overloading first-year students by balancing advanced and foundational topics.
- Provide orientation for faculty on NEP, OBE, and autonomous assessment structures.

Conclusion:

- The DAC reviewed the upcoming Autonomous II year syllabus and provided the above recommendations.
  The Committee authorizes forwarding the revised and refined syllabus proposal to the Board of Studies (BoS) for further review and approval.

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Members Present:

Sl.No.	Name	Signature
1	Dr.K.L.Sai Prasad	
2	Dr.G.Sudheer	
3	Dr.A.Suseelatha	
4	Dr.A.Kameswara Rao	
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9	Dr.R.Neelima	

HoD-BS&H

HEAD
DEPARTMENT OF
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GVP COLLEGE OF ENGINEERING FOR WOMEN
ADHURAWADA, VISAKHAPATNAM-530 040

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(Accredited by National Board of Accreditation[NBA] for B.Tech EEE valid from 2023-24 to 2025-2026)
(Accredited by National Assesment and Accreditation Council [NAAC] with A Grade- valid from 2022-27)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Date: 02-06-24

INTERNAL NOTE

This is to inform all the Faculty of CSE that Department Advisory Committee is revised. I thank all the previous members for their continuous support in making decisions for improvement of the Department. Following is the New Committee

DEPARTMENT ADVISORY COMMITTEE MEMBERS

1. Dr. PVS Lakshmi Jagadamba HoD, CSE … In the chair
2. Dr. N.Sharmili, Associate Professor, CSE
3. Dr.V.Lakshamana Rao, Assistant Professor, CSE
4. Mrs. K. Suneetha, Assistant Professor, CSE
5. Mrs. V Gowtami Annapurna, Assistant Professor, CSE

Copy to:

Principal
Vice Principal
Mr.S.Sumahasan
Dr. V.Lakshamana Rao

GVP COLLEGE OF ENGG FOR WOMEN ★ VISAKHAPATNAM ★

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Head of Department
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Madhurawada, Visakhapatnam-48

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Date: 02-06-24

DEPARTMENT ADVISORY COMMITTEE MEMBERS

1. Dr. PVS Lakshmi Jagadamba HoD, CSE ... In the chair
2. Dr. N.Sharmili, Associate Professor, CSE
3. Dr.V.Lakshamana Rao, Assistant Professor, CSE
4. Mrs. K. Suneetha, Assistant Professor, CSE
5. Mrs. V Gowtami Annapurna, Assistant Professor, CSE

GVP COLLEGE OF ENGG FOR WOMEN * VISAKHAPATNAM *

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

MINUTES OF THE MEETING OF THE DEPARTMENT ADVISORY COMMITTEE HELD ON 26th JULY 2024 IN THE HOD'S CHAMBER

Members present:

1. Dr. PVS Lakshmi Jagadamba HoD, CSE ... In the chair
2. Dr. N.Sharmili, Associate Professor, CSE
3. Dr.V.Lakshman Rao, Assistant Professor, CSE
4. Mrs. K. Suneetha, Assistant Professor, CSE
5. Mrs. V Gowtami Annapurna, Assistant Professor, CSE

Agenda:

1. Elective subjects to offer for IV B. Tech CSE, Semester-I, AY: 2023-24
2. Planning of training and placement activities.
3. Planning of Academic and Co-Circular activities.
4. Any other issues with the permission of chair.

The members discussed and resolved the following:

1. The chairman welcomed all members and briefed about the compulsory courses, elective courses, and lab courses in R20 for IV BTech to consider in the odd semester 2024-25
2. From II, III years GVPCEW has been affiliated to ANDHRA UNIVERSITY, VISAKHAPATNAM. DAC members provided feedback on the contents of new curriculum in AU CSE. HoD then requested the DAC members to submit the detailed feedback report on the II,III CSE Courses
3. In JNTUK R20 Regulations (IV-I) DAC decided to take options to choose one from the following courses for IV CSE students.

Elective III for IV CSE: 1. Cloud Computing
2. Cyber Security Forensics

Elective IV for IV CSE: 1. Deep Learning Techniques
2. Computer Vision

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Elective V for IV CSE: 1. Block Chain Technologies
2. Ethical Hacking

Open Elective III/Job Oriented Course for IV CSE: DAC members recommended to go for Job Oriented Course API Micro Services to all the students.

Open Elective IV: ECE Department will handle Open Elective IV. They recommended to choose one form the following courses for IV CSE students

1.Data Communications

2.Digital Logic Design

SKILL COURSES: 1.Mean Stack Technologies2
2.Python Deep Learning

HOD informed DAC members that Cloud Computing and Deep Learning Techniques are opted by the most of the Students as Elective III, Elective IV respectively. Hence it is decided to offer the above courses to all the students

Elective III for IV CSE: 1. Cloud Computing
Elective IV for IV CSE: 2. Deep Learning Techniques

4 As per JNTU R20 Regulations, DAC recommended the following courses as Open Electives

Open Elective III: AI tools and Techniques for IV ECE & IV EEE students

Open Elective IV: Block Chain Technologies for IV ECE students

5. In AU Regulations (III-I) DAC decided to offer Data Warehousing and Data Mining as Professional Elective-I to all students as it is necessary course to learn in III year.

Professional Elective-I for III CSE: 1.Data Warehousing and Data Mining

6. AU offers a Provision to obtain MINOR degree in ECE to the 2022 Admitted Batch only.In this regard student have to complete 2 of the 4 following courses as Open Electives.

Open Electives

1. Digital Logic Design(I-II Compulsory Subject)

2. Microprocessors (II-II Compulsory Subject)

3. Mobile Cellular Communication(III-I Open Elective)

4. GPS Principles And Its Applications(IV-I Open Elective)

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DAC recommended to offer MCC as Open Elective I to III CSE students

Open Elective I for III CSE: Mobile Cellular Communications

7. As per JNTUK R20 regulation the project work must be submitted in IV-II semester. DAC members discussed and recommended the Project Coordinators to start the Project Batches Division and Guide Allocation

8. As per JNTUK R20 regulation, Internship which is done by the students at the end of III-II semester must be submitted in the IV-I semester. DAC recommended Internship Coordinator to monitor the Internship status.

9. HOD requested DAC members to verify course files and lab files of the previous semester as part of Academic audit.

10. DAC members discussed about the academic and co-curricular activities to conduct in this semester. Keeping in view the Gap Analysis, the Academic plan for this session has been prepared to bridge the gap.

(a) DAC recommended to conduct workshops/training for 3rd and 2nd year students on Problem solving skills and latest trends on topics such as Quantum Computing, and UI Development.

(b) DAC recommended to conduct workshops/training for 3rd and 2nd year students on DEVOPS and Python courses to bridge the gap as they are not there in the curriculum of Andhra University

(c) DAC recommended to conduct Faculty Development Programs on latest technologies like Agile Methodologies, DEVOPS, Microsoft Azure AI

(d) DAC recommended to conduct student activities under COSCENGERS and CSI professional body chapters.

(e) In this regard, DAC recommended course-coordinators to coordinate with subjects handling faculty to identify content beyond syllabus in their respective subjects for pertaining POs.

11. As GVP College of Engineering for Women has been granted Autonomous Status from the Academic Year 2024–25, the I B.Tech and I M.Tech Course Structure and Syllabus are to be approved by the Board of Studies. The HOD has requested DAC members to review and provide suggestions on the tentative course structure and syllabus, to be finalized in the BoS meeting scheduled on 03-08-2024 at the GVPCEW (A) premises.

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Members Present:

S.No.	Name	Signature
1	Dr. PVS Lakshmi Jagadamba HoD, CSE	
2	Dr. N Sharmilli, Associate Professor, CSE	
3	Dr.V.Lakshman Rao, Assistant Professor, CSE	
4	Mrs. K. Suneetha, Assistant Professor, CSE	
5	Mrs. V.Gowtami, Assistant Professor, CSE	

Date: 26-07-2024

GVP COLLEGE OF ENGG FOR WOMEN (A) ★ VISAKHAPATNAM ★

HoD-CSE
Head of Department
Dept. of Computer Science & Engineering
GVP College of Engineering for Women
Madhurawada, Visakhapatnam-48

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GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

MINUTES OF THE MEETING OF THE DEPARTMENT ADVISORY COMMITTEE

HELD ON 11th December 2024 IN THE HOD'S CHAMBER

Members present:

1. Dr. PVS Lakshmi Jagadamba HoD, CSE … In the chair
2. Dr. N.Sharmili, Associate Professor, CSE
3. Dr.V.Lakshman Rao, Assistant Professor, CSE
4. Mrs. K. Suneetha, Assistant Professor, CSE
5. Mrs. V Gowtami Annapurna, Assistant Professor, CSE

Agenda:

1. Ensuing Electives of III B. Tech for Semester-II, AY: 2024-25
2. Planning of Academic and Co-Circular activates.
3. Any other issues with the permission of chair.

The members discussed and resolved the following:

1. The chairman welcomed all members and reviewed the minutes of previous DAC meeting, briefed about the compulsory courses, elective courses, and lab courses in AU regulation to consider in the even semester 2024-25

2. In AU Regulations (III-II) DAC decided to take options to choose one from the following courses for III CSE students.

Professional Elective II for III CSE: 1. Cloud Computing
2. Software Project Management

Open Elective II for III CSE : 1.Data Science
2.Block Chain Technologies

3. As per AU Regulations, DAC recommended the following courses as Open electives/Minor in CSE for other branches.

Data Science for III ECE and III EEE Students.

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4. As per orders given by AU and APSCHE, all students of 2nd and 3rd years have to do 6-week internship during summer vacation and will be evaluated in 2025-26 odd semester. In this regard, HOD sensitized all DAC members about the internship given in AU Regulations. HOD requested DAC members to submit recommendations on the internship project.

5. HOD requested DAC members to verify course files and lab files of the previous semester as part of Academic audit.

6.DAC members discussed about the academic and co-curricular activities to conduct in this semester. Keeping in view the Gap Analysis, the Academic plan for this session has been prepared to bridge the gap.

(a) DAC recommended to conduct workshops/training for 3rd and 2nd year students on Problem solving skills and latest trends on topics such as Data Structures, Machine Learning Fundamentals Using Python. HOD informed that some of the activities such as UI Development, DEVOPS planned in the previous semester will be conducted in current semester.

(b) HOD informed to conduct another Faculty Development Program also which is planned in previous semester will be conducted in the current semester.

(c) DAC recommended to conduct student activities under COSCENGERS, CSI professional body chapters.

(d) In this regard, DAC recommended course-coordinators to coordinate with subjects handling faculty to identify content beyond syllabus in their respective subjects for pertaining POs.

7. DAC has discussed the PO/PSO attainment levels for 20-24 Admitted Batch(R20 Regulation).Basing on the results of 2020-24 Batch, DAC has finalized the CO Attainment as 45% and PO target is increased to 68%. Since students performed well owing to the activities conducted by the department, all POs were attained.

8. The HOD has requested the DAC members to provide suggestions for the preparation of the II, III, and IV B.Tech and II M.Tech Course Structure and Syllabus for the 2024–25 batch onwards, as GVPCEW (A) is planning to conduct the Board of Studies (BoS) meeting in the month of February/March 2025.

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Members Present:

S.No.	Name	Signature
1	Dr. PVS Lakshmi Jagadamba HoD, CSE	
2	Dr. N Sharmilli, Associate Professor, CSE	
3	Dr.V.Lakshman Rao, Assistant Professor, CSE	
4	Mrs. K. Suneetha, Assistant Professor, CSE	K.Suneetha
5	Mrs. V.Gowtami, Assistant Professor, CSE	

Date: 11-12-2024

HoD-CSE

Head of Department
Dept. of Computer Science & Engineering
GVP College of Engineering for Women
Madhurawada, Visakhapatnam-48

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GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN

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EAPCET Councelling Code
GVPW

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (AI&ML)

Date: 29/07/2024

MINUTES OF THE MEETING

Members present:

1. Dr. Dwiti Krishna Bebarta, HoD, CSE(AI&ML) … In the chair
2. Dr. K Purushottam Naidu, CSE(AI&ML)
3. Ms. D. Balasantoshimata, CSE (AI&ML)

Agenda:

1. Discussion on 4-1 course structure and detailed syllabus of R-20 regulation, JNTUK.
2. Elective subject to offer for IV-1 B. Tech CSE (AI&ML) students, R-20 regulation. AY: 2024-25
3. Planning of Academic and Co-Circular activities during AY: 2024-2025, odd semester.
4. Any other issues with the permission of chair

The members discussed and resolved the following:

1. The chairman welcomed all members of the DAC.
2. Members of the committee discussed about the course structure and syllabus content of 4-1 in detail proposed by the University.
3. The chairman has briefed about the compulsory courses, elective courses, and lab courses for IV-I B. Tech CSE (AI&ML) for the AY-2024-25.
4. DAC members decided three elective courses based on the merit from the pool of five listed courses mentioned in the JNTUK R-20 regulation. Later let students prefer any one choice which may benefit in their professional life.

Professional Elective-III

1. Reinforcement Learning
2. Soft Computing
3. Cryptography and Network Security
4. Block Chain Technologies
5. Speech Processing

The three courses proposed by the committee are given below:

1. Reinforcement Learning
2. Cryptography and Network Security
3. Speech Processing

Professional Elective-IV

1. Robotic Process Automation
2. Cloud Computing
3. Big Data Analytics
4. NOSQL Databases
5. Video Analytics

The three courses proposed by the committee are given below:

1. Cloud Computing
2. Big Data Analytics
3. Video Analytics

Professional Elective-V

1. Social Network Analysis
2. Recommender Systems
3. AI Chatbots
4. Object Oriented Analysis and Design
5. Semantic Web

The three courses proposed by the committee are given below:

1. Social Network Analysis
2. AI Chatbots
3. Object Oriented Analysis and Design

Open Elective-III

Open Electives offered by other departments

1. Principles of Communications (ECE)
2. Fundamentals of Electric Vehicle (EEE)

API and Microservices (Job Oriented Course)

Open Elective-IV

Open Electives offered by other departments

Options

1. Concepts of Smart Grid Technologies (EEE)
2. Data Communications (ECE)

Secure Coding Techniques (Job Oriented Course)

5. HoD requested DAC members to verify course files and lab related files of the previous semester as part of Academic audit.
6. HoD requested the members to plan the academic calendar (2024-2025 odd sem) for the Department about teaching-learning activities and inform the same to concern coordinator for preparation.

Members Present:

Sl. No.	Name of the Staff Member	Designation	Signature
1	Dr. Dwiti Krishna Bebarta	Associate Professor & HoD	
2	Dr. K Purushotam Naidu	Assistant Professor	
3	Ms. D. Balasantoshimata	Assistant Professor	

Date: 29-07-2024

HoD-CSE (AI&ML)
Head of Department
Dept. of Computer Science & Engineering (AIML)
GVP College of Engineering for Women
Madhurawada, Visakhapatnam-48

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN

Kommadi, Madhurawada, Visakhapatnam 530 048
(Approved by AICTE, New Delhi, Affiliated to Andhra University, Visakhapatnam)
(Accredited by National Board of Acciditation [NBA] for B.Tech CSE, ECE and IT - valid from 2019-22 and 2022-25)
(Accredited by National Assesment and Accreditation Council [NAAC] with A Grade - valid from 2022-2027)
Phone: +91-891-2739144, 2739124, 2719125, 2719127 Email id: gvpcew@gmail.com, info@gvpcew.ac.in

EAPCET Counselling Code
GVPW

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (AI&ML)

Date: 19/08/2024

MINUTES OF THE MEETING

Members present:

1. Dr. Dwiti Krishna Bebarta, HoD, CSE(AI&ML) ... In the chair
2. Dr. K Purushottam Naidu, CSE(AI&ML)
3. Ms. D. Balasantoshimata, CSE (AI&ML)

Agenda:

1. Discussion on 3-1 course structure and detailed syllabus of R-22 regulation, Andhra University (AU).
2. Elective subjects to offer for III-1 for B. Tech CSE (AI&ML) students AY: 2024-25
3. Any other issues with the permission of chair

The members discussed and resolved the following:

1. The chairman welcomed all members of the DAC.
2. The chairman has briefed about the compulsory courses, elective courses, and lab courses for III-I, B. Tech CSE (AI&ML) for the AY-2024-25 (R-22 regulations, AU)
3. DAC members decided three elective courses based on the merit from the pool of listed professional and open elective courses mentioned in the AU, R-22 regulation. Later let students prefer their choice which may benefit in their professional life.

Professional Elective-I:
The three courses proposed by the committee are given below:

1. Software Project Management
2. Compiler Design
3. Cloud Computing

Open Elective-I
The three courses proposed by the committee are given below:

1. Python Programming
2. Python for Data Science
3. NoSQL Database

4. DAC members discussed about the academic and co-curricular activities to conduct in this semester. Keeping in view the Gap Analysis, the Academic plan for this session has been prepared to bridge the curriculum gap.

   (a) DAC recommended for conducting workshops/training activities for the students on problem solving skills and latest trends on Machine Learning, Block Chain, and PySpark, etc.

   (b) DAC recommended course-coordinators to coordinate with subjects handling faculty to identify content beyond syllabus for pertaining POs.

Members Present:

Sl. No.	Name of the Staff Member	Designation	Signature
1	Dr. Dwiti Krishna Bebarta	Associate Professor & HoD	
2	Dr. K Purushotam Naidu	Assistant Professor	
3	Ms. D. Balasantoshimata	Assistant Professor	

Date: 19-08-2024

HoD-CSE (AI&ML)
Head of Department
Dept. of Computer Science & Engineering (AIML)
GVP College of Engineering for Women
Madhurawada, Visakhapatnam-48

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EAPCET Councelling Code GVPW

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (AI&ML)

Date: 10/09/2024

MINUTES OF THE MEETING

Members present:

1. Dr. Dwiti Krishna Bebarta, HoD, CSE(AI&ML) ... In the chair
2. Dr. K Purushottam Naidu, CSE(AI&ML)
3. Ms. D. Balasantoshimata, CSE (AI&ML)

Agenda:

1. Discussion on 2-1 course structure and detailed syllabus of R-22 regulation, Andhra University (AU).
2. Any other issues with the permission of chair

The members discussed and resolved the following:

1. The chairman welcomed all members of the DAC.
2. The chairman has briefed about the compulsory theory courses, lab courses, and skill course for II-I, B. Tech CSE (AI&ML) for the AY-2024-25 (R-22 regulations, AU)
3. DAC members discussed about the academic and co-curricular activities to conduct in this semester. Keeping in view the Gap Analysis, the Academic plan for this session has been prepared to bridge the curriculum gap.
   (a) DAC recommended for conducting workshops/training activities for the students on problem solving skills and latest trends on CSE (AI&ML).
   (b) DAC recommended course-coordinators to coordinate with subjects handling faculty to identify content beyond syllabus for pertaining POs.

Members Present:

Sl. No.	Name of the Staff Member	Designation	Signature
1	Dr. Dwiti Krishna Bebarta	Associate Professor & HoD	
2	Dr. K Purushotam Naidu	Assistant Professor	
3	Ms. D. Balasantoshimata	Assistant Professor	

Date: 10-09-2024

HOD-CSE (AI&ML)
Dept. of Computer Science & Engineering (AIML)
GVP College of Engineering for Women
Madhurawada, Visakhapatnam-48

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN

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EAPCET Counselling Code GVPW

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (AI&ML)

Date: 07/01/2025

MINUTES OF THE MEETING

Members present:

1. **Dr. Dwiti Krishna Bebarta, HoD, CSE(AI&ML)** **... In the chair**
2. Dr. K Purushottam Naidu, CSE(AI&ML)
3. Ms. D. Balasantoshimata, CSE (AI&ML)

Agenda:

1. Discussion on 3-2 course structure and detailed syllabus of R-22 regulation, Andhra University (AU).
2. Elective subjects to offer for III-II for B. Tech CSE (AI&ML) students, R-22 regulation. AY: 2024-25
3. Any other issues with the permission of chair

The members discussed and resolved the following:

1. The chairman welcomed all members of the DAC.
2. The chairman has briefed about the compulsory courses, elective courses, and lab courses for IV-II, III-II, and II-II of B. Tech CSE (AI&ML) for the AY-2023-24 (R-20 and R-22 regulations).
3. DAC members have decided three elective courses based on the merit from the pool of listed in the AU R-22 regulation. Later let students prefer their choice which may be benefited in their professional life.

Professional Elective-II

The following three courses are proposed by the committee are given below:

1. Morden Cryptography and Network Security
2. Cloud Computing
3. Software Engineering
4. Game DEvelopment

Open Elective-II

The following three courses are proposed by the committee are given below:

1. AI Chatbot
2. Mobile Computing
3. Internet of Things
4. Renewable Energy Source

4. DAC members discussed about the academic and co-curricular activities to conduct in this semester. Keeping in view the Gap Analysis, the Academic plan for this session has been prepared to bridge the curriculum gap.

   (a) DAC recommended to conduct workshops/training for 3rd year students on problem solving skills and latest trends in computer science.

   (b) DAC recommended course-coordinators to coordinate with subjects handling faculty to identify content beyond syllabus for pertaining POs.

Members Present:

Sl. No.	Name of the Staff Member	Designation	Signature
1	Dr. Dwiti Krishna Bebarta	Professor & HoD	
2	Dr. K Purushotam Naidu	Associate Professor	
3	Ms. D. Balasantoshimata	Assistant Professor	

Date: 07-01-2025

HoD-CSE(AI&ML)

Head of the Department
Dept. of Computer Science & Engineering (AIML)
GVP College of Engineering for Women
Madhurawada, Visakhapatnam-48

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN

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EAPCET Counselling Code
GVPW

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (AI&ML)

Date: 17/02/2025

MINUTES OF THE MEETING

Members present:

1. **Dr. Dwiti Krishna Bebarta, HoD, CSE(AI&ML)** **... In the chair**
2. Dr. K Purushottam Naidu, CSE(AI&ML)
3. Ms. D. Balasantoshimata, CSE (AI&ML)

Agenda:

1. Discussion on 2-2 course structure and detailed syllabus of R-22 regulation, Andhra University (AU).
2. Any other issues with the permission of chair

The members discussed and resolved the following:

1. The chairman welcomed all members of the DAC.
2. The chairman has briefed about the compulsory courses, skill course, and lab courses for II-II of B. Tech CSE (AI&ML) for the AY-2024-25 (R-22 regulations).
3. DAC members have decided three elective courses based on the merit from the pool of listed in the AU R-22 regulation. Later let students prefer their choice which may be benefited in their professional life.
4. DAC members discussed about the academic and co-curricular activities to conduct in this semester. Keeping in view the Gap Analysis, the Academic plan for this session has been prepared to bridge the curriculum gap.
   (a) DAC recommended for conducting workshops/training for 2nd year students on problem solving skills and latest trends in computer science.
   (b) DAC recommended course-coordinators to coordinate with subjects handling faculty to identify content beyond syllabus for pertaining POs.
5. The chairman has briefed about the Major Project Work, Seminar, Internship which is mentioned in IV-I B. Tech CSE (AI&ML) students under JNTUK syllabus.
6. The chairman has instructed the coordinator for planning internal reviews to monitor the progress of the project work. Also informed the all project batches must work on research articles and try to publish their work in reputed journals.

Members Present:

Sl. No.	Name of the Staff Member	Designation	Signature
1	Dr. Dwiti Krishna Bebarta	Professor & HoD	
2	Dr. K Purushotam Naidu	Associate Professor	
3	Ms. D. Balasantoshimata	Assistant Professor	

Date: 17-02-2025

HoD-CSE (AI&ML)
Head of Department
Dept. of Computer Science & Engineering (AIML)
GVP College of Engineering for Women
Madhurawada, Visakhapatnam-48

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
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(ACCREDITED BY NATIONAL BOARD OF ACCREDITATION[NBA] FOR B.TECH EEE VALID FROM 2023-24 TO 2025-2026)
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DEPARTMENT OF INFORMATION TECHNOLOGY

Date: 05/08/2024

DEPARTMENT OF ADVISORY COMMITTEE (DAC) MEMBERS

ACADEMIC YEAR 2024-25

1. Dr. M. Bhanu Sridhar, Professor & HOD … In the chair
2. Mrs. R. Sridevi, Asst. Professor
3. Mr. G. Tirupati, Asst. Professor

Agenda:

1. Ensuring subjects, Project-I for IV B. Tech and Electives of II, III, IV B. Tech, Semester-I, A.Y: 2024-2025.
2. Preparation of Course Outcomes, CO-PO Mapping, and justification for the odd semester subjects of R-20 regulations (JNTUK) and R-22 regulations (AU).
3. Planning of Academic and Co-Circular activates.
4. Any other issues with the permission of chair.

The members discussed and resolved the following:

1. The chairman welcomed all members and briefed about the compulsory courses, elective courses, and lab courses in two regulations (R-20 for IV B. Tech, JNTUK) and R-22 (AU) for III and II B. Tech to consider in this semester 2024-25 odd semester.
2. In R-20 Regulations (IV-I, JNTUK) and R-22 Regulations-AU (III-I and II-I) DAC decided to take options to choose one from the following courses for IV IT, III IT and II IT students.

Open Elective- III for IV IT: Electronic Measurements and Instrumentation
Open Elective-IV for IV IT: Digital Logic Design/Data Communications
Professional Elective-III for IV IT: Cloud Computing
Professional Elective-IV for VI IT: Deep Learning Techniques
Open elective-I for III-IT: Mobile and Cellular Communication
Professional elective-I for III-IT: Compiler Design
Skill course for III-IT: Soft Skills
Skill course for II-IT: Web Technologies

3. DAC members requested the course-coordinators to coordinate with subjects handling faculty in preparation of the COs, CO-PO/PSO mapping and its justification for the subjects of R-20 (4-2 and 3-2 courses) & R22-AU (2-2) regulations.
4. DAC members discussed about the academic and co-curricular activities to be conducted in this semester. The Academic plan for this academic session has been prepared keeping in view the following
    a. DAC recommended to increase student activities under SPIKE, IEEE professional body chapters.
5. HOD requested DAC members to verify course files and lab files of the previous semester as part of Academic audit.

Members Present:

S.No.	Name	Signature
1	Dr. M. Bhanu Sridhar, Assoc. Professor & HOD	
2	Ms. R. Sridevi, Assistant Professor	
3	Mr. G. Tirupati, Assistant Professor	

HOD-IT

Date: 05-08-2024

Head of Department
Dept. of Information Technology
GVP College of Engineering for W
Madhurawada, Visakhapatnam-

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
Kommadi, Madhurawada, Visakhapatnam - 530 048
(Approved by AICTE, New Delhi, Affiliated to Andhra University, Visakhapatnam)
(Accredited by National Board of Accreditation [NBA] for B.Tech CSE, ECE and IT - valid from 2019-22 and 2022-25)
(ACCREDITED BY NATIONAL BOARD OF ACCREDITATION[NBA] FOR B.TECH EEE VALID FROM 2023-24 TO 2025-2026)
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DEPARTMENT OF INFORMATION TECHNOLOGY

Date: 20/01/2025

DEPARTMENT OF ADVISORY COMMITTEE (DAC) MEMBERS

ACADEMIC YEAR 2024-25

1. Dr. M. Bhanu Sridhar, Professor & HOD … In the chair
2. Mrs. R. Sridevi, Asst. Professor
3. Mr. G. Tirupati, Asst. Professor

Agenda:

1. Ensuing Major Project Work, seminar and Internship for IV B. Tech (JNTUK) and Electives of II and III B. Tech (AU), Even Semester, A.Y: 2024-2025.
2. Preparation of Course Outcomes, CO-PO Mapping, and justification for the even semester project/subjects of R-20 regulations (JNTUK) and R-22 regulations (AU).
3. Planning of Academic and Co-Circular activates.
4. Any other issues with the permission of chair.

The members discussed and resolved the following:

1. The chairman welcomed all members and briefed about the compulsory courses, elective courses, and lab courses in two regulations (R-20 for IV B. Tech, R-20 for III & R-22 (AU) for II B. Tech) to consider in this semester 2023-24 odd semester.
2. In R-20 Regulations (IV-II) and R-22 Regulations-AU (II-II, III-II) DAC decided to take options to choose one from the following courses for III IT and II IT students.

Open Elective II for III IT: Fundamentals of Utilization of Electrical Engineering

Professional Elective II for III IT: Mobile Computing

Skill course for III-IT: Data Science: Natural Language Processing

Skill course for II-IT: Web Technologies

3. DAC members requested the course-coordinators to coordinate with subjects handling faculty in preparation of the COs, CO-PO/PSO mapping and its justification for the subjects of R-20 (4-2) & R22-AU (3-2 and 2-2) regulations.
4. DAC members discussed about the academic and co-curricular activities to be conducted in this semester. The Academic plan for this academic session has been prepared keeping in view the following
    a. DAC recommended to increase student activities under SPIKE, IEEE professional body chapters.
5. HOD requested DAC members to verify course files and lab files of the previous semester as part of Academic audit.

Members Present:

S.No.	Name	Signature
1	Dr. M. Bhanu Sridhar, Assoc. Professor & HOD	
2	Ms. R. Sridevi, Assistant Professor	
3	Mr. G. Tirupati, Assistant Professor	

Date: 20-01-2025

HOD-IT

Head of Department
Dept. of Information Technology
GVP College of Engineering for Women
Madhurawada, Visakhapatnam-48

GAYATRI VIDYA PARISHAD
COLLEGE OF ENGINEERING FOR WOMEN (AUTONOMOUS)

Madhurawada :: Visakhapatnam – 530 048

(Approved by AICTE, New Delhi and Affiliated to Andhra University)

Accredited by NAAC with "A" grade from 2022 to 2027

CSE, ECE and IT Courses Accredited by NBA (2019-2022) and Re-accredited by NBA (2022-2025)

EEE Course Accredited by NBA (2023-2026)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Date: 06-07-2024

Minutes of the DAC meeting held on 8th July, 2024 in HOD cabin

Members Present:

1. Dr R V S Lakshmi Kumari HoD, EEE … In the chair
2. Dr P Devendra, Associate Professor, EEE
3. Dr A S V Vijayalakshmi, Assistant Professor, EEE
4. Dr M Krishna, Assistant Professor, EEE

Agenda:

1. Elective subjects to be offered for 4-1 and 3-1 EEE students for the academic year 2024-25 for semester 1.
2. Preparation of course outcomes for 3-1 EEE syllabus
3. Planning of Academic activities during the first semester for the academic year 2024-25
4. Planning of Board of Studies meeting 1 in the month of August 2024

The members discussed and resolved the following

1. The chairman has welcomed all the members of DAC and briefed about the subjects which are to be opted for professional electives and open electives.
2. DAC has informed the faculty who are handling final year EEE subjects (both theory and labs) to submit the course outcomes by 16th August 2024 for the approval of DAC.
3. Based on faculty specialization and experience, Dr ASV Vijayalakshmi is nominated as **Lab In-charge** for the laboratory which was introduced in III year AU syllabus as skill oriented course and she is instructed to look into the syllabus and obtain quotations from authorized suppliers and initiate procurement procedures in consultation with the HoD.

4. DAC has finalized the proposed syllabus for Board of Studies meeting 1 for first year EEE courses and informed the same to the faculty of the Department. The meeting is planned to conduct in the month of August 2024 for finalizing the first year syllabus.
5. DAC has discussed and planned the activities planned for the academic year 2024-25 for semester 1.
6. DAC has suggested giving two subjects for professional Elective 1 and two subjects for Open Elective 1 for 3-1 EEE (as per AU regulations) students and two subjects for Professional Elective 3, 4 and 5, two subjects for Open Elective 3 and 4 for 4-1 EEE (R20 Regulations – JNTUK) students after the detailed discussion with the concerned faculty of the Departments and HoDs, for the benefit of the students in making them as industry ready. The list of subjects along with the names of the faculty are as follows:

E.E.E OF IV B TECH - 1 SEMESTER (R20) OPEN ELECTIVE III, IV AND PROFESSIONAL ELECTIVES III, IV AND V for AY 2024-25

		Name of the Faculty	Offered by the Department
List of PROFESSIONAL ELECTIVES I offered by the Dept.	FACTS	Dr ASV Vijayalakshmi	EEE
	Renewable and Distributed Energy Technologies	Mrs V Sreevidya	EEE
List of PROFESSIONAL ELECTIVES IV offered by the Dept.	Hybrid Electric Vehicles	Dr P Devendra	EEE
	High Voltage Engineering	Dr R V S Lakshmi Kumari	EEE
List of PROFESSIONAL ELECTIVES V offered by the Dept.	Power System Operation and Control	Dr M Krishna	EEE
	AI Applications to Electrical Engineering	Dr ASV Vijayalakshmi	EEE
List of OPEN ELECTIVES III offered by the Dept.	AI Tools and Techniques	Mrs A Gauthami	CSE
	Data Science	Mr H Gauthami	CSM
List of OPEN ELECTIVES IV offered by the Dept	Cloud Computing with AWS	Mr P Siva	CSM
	Deep Learning Techniques	Dr K P Naidu	CSM

E.E.E OF III B TECH - 1 SEMESTER OPEN ELECTIVE I AND PROFESSIONAL ELECTIVE I for AY 2024-25

		Name of the Faculty	Offered by the Department
List of PROFESSIONAL ELECTIVES I offered by the Dept.	Utilization of Electrical Energy	Mrs B Kusuma Kumari	EEE
	Electrical Distribution Systems	Ms P Sai Jyothi	EEE
List of OPEN ELECTIVE I	Artificial Intelligence and Machine Learning	Dr ASV Vijayalakshmi	EEE
	Computer Architecture and Organization	Mrs P Sowmya	CSE

Members Present:

S.No	Name	Signature
1	Dr R V S Lakshmi Kumari (Associate Professor & HoD(EEE))	
2	Dr P Devendra (Associate Professor)	
3	Dr ASV Vijayalakshmi (Assistant Professor)	
4	Dr M Krishna (Assistant Professor)	

Date: 08-07-24

HEAD OF THE DEPARTMENT
Head
Dept. of Electrical & Electronics Engineering
G.V.P. College of Engineering for Women
Madhurawada
VISAKHAPATNAM-530 048

GAYATRI VIDYA PARISHAD
COLLEGE OF ENGINEERING FOR WOMEN (AUTONOMOUS)

Madhurawada :: Visakhapatnam – 530 048

(Approved by AICTE, New Delhi and Affiliated to Andhra University)

Accredited by NAAC with "A" grade from 2022 to 2027

CSE, ECE and IT Courses Accredited by NBA (2019-2022) and Re-accredited by NBA (2022-2025)

EEE Course Accredited by NBA (2023-2026)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Date: 06-07-2024

Minutes of the DAC meeting held on 8th July, 2024 in HOD cabin

Members Present:

1. Dr R V S Lakshmi Kumari HoD, EEE … In the chair
2. Dr P Devendra, Associate Professor, EEE
3. Dr A S V Vijayalakshmi, Assistant Professor, EEE
4. Dr M Krishna, Assistant Professor, EEE

Agenda:

1. Elective subjects to be offered for 4-1 and 3-1 EEE students for the academic year 2024-25 for semester 1.
2. Preparation of course outcomes for 3-1 EEE syllabus
3. Planning of Academic activities during the first semester for the academic year 2024-25
4. Planning of Board of Studies meeting 1 in the month of August 2024

The members discussed and resolved the following

1. The chairman has welcomed all the members of DAC and briefed about the subjects which are to be opted for professional electives and open electives.
2. DAC has informed the faculty who are handling final year EEE subjects (both theory and labs) to submit the course outcomes by 16th August 2024 for the approval of DAC.
3. Based on faculty specialization and experience, Dr ASV Vijayalakshmi is nominated as **Lab In-charge** for the laboratory which was introduced in III year AU syllabus as skill oriented course and she is instructed to look into the syllabus and obtain quotations from authorized suppliers and initiate procurement procedures in consultation with the HoD.

4. DAC has finalized the proposed syllabus for Board of Studies meeting 1 for first year EEE courses and informed the same to the faculty of the Department. The meeting is planned to conduct in the month of August 2024 for finalizing the first year syllabus.
5. DAC has discussed and planned the activities planned for the academic year 2024-25 for semester 1.
6. DAC has suggested giving two subjects for professional Elective 1 and two subjects for Open Elective 1 for 3-1 EEE (as per AU regulations) students and two subjects for Professional Elective 3, 4 and 5, two subjects for Open Elective 3 and 4 for 4-1 EEE (R20 Regulations – JNTUK) students after the detailed discussion with the concerned faculty of the Departments and HoDs, for the benefit of the students in making them as industry ready. The list of subjects along with the names of the faculty are as follows:

E.E.E OF IV B TECH - 1 SEMESTER (R20) OPEN ELECTIVE III, IV AND PROFESSIONAL ELECTIVES III, IV AND V for AY 2024-25

		Name of the Faculty	Offered by the Department
List of PROFESSIONAL ELECTIVES I offered by the Dept.	FACTS	Dr ASV Vijayalakshmi	EEE
	Renewable and Distributed Energy Technologies	Mrs V Sreevidya	EEE
List of PROFESSIONAL ELECTIVES IV offered by the Dept.	Hybrid Electric Vehicles	Dr P Devendra	EEE
	High Voltage Engineering	Dr R V S Lakshmi Kumari	EEE
List of PROFESSIONAL ELECTIVES V offered by the Dept.	Power System Operation and Control	Dr M Krishna	EEE
	AI Applications to Electrical Engineering	Dr ASV Vijayalakshmi	EEE
List of OPEN ELECTIVES III offered by the Dept.	AI Tools and Techniques	Mrs A Gauthami	CSE
	Data Science	Mr H Gauthami	CSM
List of OPEN ELECTIVES IV offered by the Dept	Cloud Computing with AWS	Mr P Siva	CSM
	Deep Learning Techniques	Dr K P Naidu	CSM

E.E.E OF III B TECH - 1 SEMESTER OPEN ELECTIVE I AND PROFESSIONAL ELECTIVE I for AY 2024-25

		Name of the Faculty	Offered by the Department
List of PROFESSIONAL ELECTIVES I offered by the Dept.	Utilization of Electrical Energy	Mrs B Kusuma Kumari	EEE
	Electrical Distribution Systems	Ms P Sai Jyothi	EEE
List of OPEN ELECTIVE I	Artificial Intelligence and Machine Learning	Dr ASV Vijayalakshmi	EEE
	Computer Architecture and Organization	Mrs P Sowmya	CSE

Members Present:

S.No	Name	Signature
1	Dr R V S Lakshmi Kumari (Associate Professor & HoD(EEE))	
2	Dr P Devendra (Associate Professor)	
3	Dr ASV Vijayalakshmi (Assistant Professor)	
4	Dr M Krishna (Assistant Professor)	

Date: 08-07-24

HEAD OF THE DEPARTMENT
Head
Dept. of Electrical & Electronics Engineering
G.V.P. College of Engineering for Women
Madhurawada
VISAKHAPATNAM-530 048

Gayatri Vidya Parishad College of Engineering for Women
Madhurawada :: Visakhapatnam – 530 048
(Affiliated to Andhra University, Approved by AICTE, New Delhi, accredited by NBA)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

MINUTES OF THE MEETING OF THE DEPARTMENT ADVISORY COMMITTEE HELD ON 28th JUNE 2024 IN THE HOD'S CHAMBER

DAC Members:

1. Dr. P.M.K. Prasad, Associate Professor, HoD, ECE … In the chair
2. Dr. L. Ganesh, Associate Professor, ECE
3. Dr. B. Vijaya Lakshmi, Associate Professor, ECE
4. Dr. D.V.A.N Ravi Kumar, Associate Professor, ECE
5. Ms. B.V.S. Renuka Devi, Assistant Professor, ECE
6. Ms. Ch. Sirisha, Assistant Professor, ECE

Agenda:

1. Discussion on ensuing subjects and electives of II, III, and IV B.Tech, Semester-I for AY 2024–25.
2. Planning of academic and co-curricular activities for the forthcoming semester.
3. Progress review of NBA and NAAC-related documentation and activities.
4. Discussion on the First-Year Autonomous course structure and courses.
5. Any other issues with the permission of the Chair.

The members discussed and resolved the following:

1. The meeting commenced with a warm welcome by **Dr. P.M.K. Prasad**, who chaired the session. He briefed the members about the agenda items and emphasized the importance of timely preparation for the forthcoming **Academic Year 2024–25**.
2. He outlined the course structure for **II Year (AU syllabus), III Year (AU syllabus), and IV Year (R-20 JNTUK syllabus)** for Semester–I, detailing the inclusion of **core subjects, professional and open electives, skill-oriented courses-OOPs through JAVA, and laboratory components**.
3. With the introduction of the new III-I AU syllabus, the Chairperson requested the DAC members to ensure that the Course Outcomes are finalized in alignment with AU guidelines and framed as per the requirements of NBA.

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4. The committee discussed the **need for equipment and consumables** for various labs and skill courses in the upcoming semester.

   In the III year AU syllabus, Digital communication and Internet of Things labs were available. The committee discussed on the need of any additional instruments and software tools.

5. Based on faculty specialization and experience, the following members were nominated as **Lab In-charges** for the laboratories which were introduced in III year AU syllabus.

   Digital Communication Lab: Ms. N Roopavathi

   Internet of Things Lab: Ms. Ch. Sirisha

It is finalized that lab in charges should look into the syllabus and obtain quotations from authorized suppliers and initiate procurement procedures in consultation with the HoD.

6. Detailed discussions were held to finalize options for **Professional and Open Electives** for **III and IV Year** students.

   It was unanimously decided to collect **student preferences** before finalizing the electives for offering.

The elective options are as follows:

III ECE

- **Open Elective–I:**

1. Artificial Intelligence and Machine Learning

- **Professional Elective–I:**

1. Electronic Measurements and Instrumentation
2. Computer Networks

IV ECE

- **Professional Elective–III:**

1. Digital Image Processing

- **Professional Elective–IV:**

1. Satellite Communications

- **Professional Elective–V:**

1. Radar Engineering
2. Internet of Things

- **Open Elective–III:**

1. Data Science
2. AI Tools & Techniques

- **Open Elective–IV:**

1. Blockchain Technologies
2. Cloud Computing using AWS

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7. The DAC reviewed academic and co-curricular activities conducted during the previous semester. It was resolved to organize **guest lectures, workshops, and seminars** on industry-relevant topics, and to promote participation in **professional bodies such as IETE, IEEE, and the student association ECLAT-A.**

   Members also proposed conducting **hands-on technical sessions** in emerging domains such as AI, VLSI, IoT, and embedded systems.

8. The Chairman instructed the DAC members to **verify course files and lab records** of the previous semester as part of the **internal academic audit process.**

9. The Chairman highlighted the progress of framing the **Autonomous course structure** for the **First-Year (2024 batch) for both B.Tech and M. Tech courses.**

   He encouraged the committee to ensure that the syllabus is outcome-based and aligned with **AICTE and industry guidelines.**

10. Since there were no further points for discussion, the meeting concluded with a note of appreciation from the Chair.

    The HoD thanked all members for their active participation, valuable inputs, and commitment towards continuous improvement of academic standards in the department.

Members Present:

S.No.	Name	Signature
1	Dr. P.M.K. Prasad, Associate Professor, ECE	
2	Dr. L. Ganesh, Associate Professor, ECE	
2	Dr. B.Vijaya Lakshmi, Associate Professor, ECE	
4	Dr. D.V.A .N Ravi Kumar, Associate Professor, ECE	
5	Ms. B.V.S. Renuka Devi, Assistant Professor, ECE	
6	Ms. Ch. Sirisha, Assistant Professor, ECE	

HoD-ECE

Date:28.06.2024

HEAD
DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING
G V P COLLEGE OF ENGINEERING FOR WOMEN
MADHURAWADA, VISAKHAPATNAM – 530 048

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Gayatri Vidya Parishad College of Engineering for Women
Madhurawada :: Visakhapatnam – 530 048
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

MINUTES OF THE MEETING OF THE DEPARTMENT ADVISORY COMMITTEE HELD ON 22nd NOVEMBER 2024 IN THE HOD'S CHAMBER

DAC Members:

1. Dr. P.M.K. Prasad, Associate Professor, HoD, ECE … In the chair
2. Dr. L. Ganesh, Associate Professor, ECE
3. Dr. B. Vijaya Lakshmi, Associate Professor, ECE
4. Dr. D.A.V.N Ravi Kumar, Associate Professor, ECE
5. Ms. B.V.S. Renuka Devi, Assistant Professor, ECE
6. Ms. Ch. Sirisha, Assistant Professor, ECE

Agenda:

1. Ensuing subjects and electives of II, III, and IV B.Tech, Semester–II, AY 2024–25.
2. Preparation for **NAAC AQAR** report submission.
3. Preparation of **II, III, and IV Year course structure and syllabus** for the **Autonomous batch**.
4. Any other issues with the permission of the Chair.

The members discussed and resolved the following:

1. The Chairman, **Dr. P.M.K. Prasad**, welcomed all the members and briefed them on the subjects, electives, skill-oriented courses, and laboratory components pertaining to **II Year (AU syllabus), III Year (AU syllabus), and IV Year (JNTUK R-20 syllabus)** for **Semester–II, AY 2024–25**. He emphasized maintaining consistency between theoretical and practical components and aligning the electives with industry requirements.
2. The syllabus for **III-II (AU curriculum)** was reviewed. Members discussed improvements in lab experiments, introduction of soft skills as skill course and course content delivery to strengthen students' conceptual understanding and hands-on experience. The Chairperson requested the DAC members to review and finalize the Course Outcomes in alignment with the AU-specified outcomes and to adhere to the prescribed guidelines while framing them.

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3. Based on faculty specialization and experience, the following members were nominated as **Lab In-charges** for the laboratories which were introduced in III year AU syllabus.

   Antenna Simulation lab: Mr. N Maheswara Rao
   Digital Signal Processing Lab: Dr. D V A N Ravi Kumar
   Microwave Engineering Lab: Ms. L Sarika

4. The committee deliberated on the selection of electives for **III Year ECE** and decided to collect student preferences before finalizing one subject under each elective category.

   Proposed Elective Options – III Year ECE

   - **Professional Elective–II:**

   1. VLSI Design
   2. Cellular Mobile Communication

   - **Open Elective–II:**

   1. Data Science

   The HoD emphasized offering electives that align with current technological trends and ensure adequate faculty expertise for course delivery.

5. It was decided to assign **Ms. M. Mani Kumari** and **Ms. B.V.R. Gowri** as **Project Coordinators** for **IV-II (R20) 2021 batch** students to monitor project progress, internal reviews, and documentation.
6. The Chairman informed members about the **NAAC Annual Quality Assurance Report (AQAR)** submission deadline and instructed faculty to ensure timely updates and completion of all required departmental files and supporting documents.
7. The committee discussed the ongoing work related to the **framing of II, III & IV year B.Tech and II year M. Tech course structure and syllabus** for the **Autonomous Regulation** applicable to upcoming batches. The Chairman advised members to align the syllabus with **AICTE guidelines** and Andhra University curriculum by incorporating **emerging technologies, interdisciplinary courses, and skill-oriented components**.
8. There being no further points for discussion, the meeting concluded with a vote of thanks to the Chair. The Chairman appreciated the active participation and contributions of all members.

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Members Present:

S.No.	Name	Signature
1	Dr. P.M.K. Prasad, Associate Professor, ECE	
2	Dr. L. Ganesh, Associate Professor, ECE	
2	Dr. B.Vijaya Lakshmi, Associate Professor, ECE	
4	Dr. D.V.A .N Ravi Kumar, Associate Professor, ECE	
5	Ms. B.V.S. Renuka Devi, Assistant Professor, ECE	
6	Ms. Ch. Sirisha, Assistant Professor, ECE	

HoD-ECE

Date: 22.11.2024

HEAD
DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING
G V P COLLEGE OF ENGINEERING FOR WOMEN
MADHURAWADA, VISAKHAPATNAM – 530 048

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Gayatri Vidya Parishad College of Engineering for Women
Madhurawada :: Visakhapatnam – 530 048
(Affiliated to Andhra University, Approved by AICTE, New Delhi, accredited by NBA)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

MINUTES OF THE MEETING OF THE DEPARTMENT ADVISORY COMMITTEE HELD ON 17th JANUARY 2025 IN THE HOD'S CHAMBER

DAC Members:

1. Dr. P.M.K. Prasad, Professor, HoD, ECE … In the chair
2. Dr. L. Ganesh, Associate Professor, ECE
3. Dr. B. Vijaya Lakshmi, Associate Professor, ECE
4. Dr. D.A.V.N Ravi Kumar, Associate Professor, ECE
5. Ms. B.V.S. Renuka Devi, Assistant Professor, ECE
6. Ms. Ch. Sirisha, Assistant Professor, ECE

Agenda

1. Discussion on the existing syllabus and course structure for II, III, and IV year B.Tech & II year M.Tech.
2. Streamlining and defining subjects into specific domains/streams.
3. Formation of research groups for each stream.
4. Allocation of subjects to respective research teams for syllabus preparation.
5. Ensuring alignment of the revised syllabus with Andhra University norms.
6. Any other matters with the permission of the Chair.

The following items were discussed and the committee resolved to forward the same to the Board of Studies for consideration and necessary action.

1. **Review of Existing Course Structure**
   - The committee reviewed the current course structure of II, III, and IV year programs.
   - It was decided to revise and update the syllabus to reflect the latest industry trends and AU guidelines.
2. **Definition of Streams**
   - The subjects were categorized into specific **streams**, such as:
     - *Core Engineering Stream*
     - *Interdisciplinary/Research Stream*
     - *Open Electives and Professional Electives*

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- Each stream will focus on specialized areas to strengthen students' technical knowledge and research orientation.

3. **Responsibility of Research Groups**
   - It was decided to assign to the existing **Research Groups**, the responsibility of preparing and revising the syllabus for subjects under their respective streams, in line with **AU** norms and industry needs.
   - Research groups will draft the syllabus in alignment with Andhra University guidelines, credit structures, and outcome-based education (OBE) framework.
   - Cross-verification with latest Regulation approved by the academic council of GVPCEW(A) was recommended.
4. **Timeline for Submission**
   - All research groups are required to submit their proposed syllabus drafts by **[15.02.2025]** for departmental review before forwarding to the Board of Studies.
5. **Other Discussions**
   - Suggestions for incorporating skill-based and value-added courses were noted.
   - The committee emphasized integrating modern tools, laboratory components,and industry-aligned mini projects.

Conclusion

The HoD thanked all the members for their active participation. The meeting concluded with the decision to reconvene after the initial draft of the revised syllabus is prepared for further review and approval.

Members Present:

S.No.	Name	Signature
1	Dr. P.M.K. Prasad, Professor, ECE	
2	Dr. L. Ganesh, Associate Professor, ECE	
2	Dr. B.Vijaya Lakshmi, Associate Professor, ECE	
4	Dr. D.V.A .N Ravi Kumar, Associate Professor, ECE	
5	Ms. B.V.S. Renuka Devi, Assistant Professor, ECE	
6	Ms. Ch. Sirisha, Assistant Professor, ECE	

Date: 17.01.2025

HoD/ECE

DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING
G V P COLLEGE OF ENGINEERING FOR WOM.
MADHURAWADA, VISAKHAPATNAM – 530 048

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DEPARTMENT BASIC SCIENCES AND HUMANITIES (MATHEMATICS)

Minutes of 2nd meeting of the Board of Studies in the Department of Basic Sciences and Humanities in Mathematics held on 4th April 2025 (Friday) at 10:00AM in hybrid mode.

The meeting of the Board of Studies in Mathematics - BS&H department of Gayatri Vidya Parishad College of Engineering for Women is held on 4th April 2025 (Friday) from 10:00AM onwards to finalize the syllabi of the 2nd year (1st and 2nd semesters) and 4th year (1st semester) courses of all B.Tech Programs and 3rd semester course of M.Tech programs offered by the Department of Basic Sciences and Humanities (Mathematics) under the regulations R – 24 from the academic year 2024-25 onwards.

Members Present:

Prof. K L Sai Prasad – Chairperson

External Members:

1	Prof P A Lakshmi Narayana Professor, Dept of Mathematics IIT – Hyderabad	Subject Expert	offline
2	Prof. K N S Kasi Viswanadham Professor, Dept of Mathematics NIT - Warangal	Subject Expert	offline
3	Prof. Ch. Santhi Sundar Raj Dept of Engineering Mathematics AU College of Engineering (A) Visakhapatnam	Vice Chancellor's Nominee	offline
4	Dr. A R J Srikanth Director Databrew Technologies Pvt Ltd	Industry Representative	offline
5	Anitha Chiluvuri Senior Member of Technical Staff (SMTS) Oracle	College Alumni	online
6	Mr. Anil Kumar Paluri Assistant Vice President Bank of America	Expert for Special Courses	offline

Internal Members:

1	Prof. G. Sudheer	Professor, Vice Principal	offline
2	Dr. A. Suseelatha	Assistant Professor	Offline
3	Dr. B. Bharathi	Assistant Professor	offline
4	Dr. A. Kameswara Rao	Assistant Professor	offline
5	Mr. SSVD Prakash Vepa	Assistant Professor	Online
6	Dr. T Poorna Kantha	Assistant Professor	offline
7	Ms. D S S S Ranjani	Assistant Professor	offline

The meeting commenced with the Principal & Chairman, Academic Council, welcoming the members of Board of Studies in Mathematics – BS&H department and requested to frame the syllabus in accordance with the guidelines of NEP-2020 and the industry standards.

Following this, the Principal informed the members about the amendment made to the Academic Rules and Regulations (R-24) for B.Tech Programs in accordance with AICTE recommendations during the Academic Council meeting held on 26.10.2024.

The amendment pertains to the B.Tech Program regulations at GVPCEW(A), effective from the 2024-25 admitted batch. As per Section 17 (A-ii) of the Academic Rules & Regulations (R-24), the previous requirement for earning a B.Tech Degree with a Minor was to complete 12 credits within the 160-credit framework of the B.Tech program. This condition has now been revised, requiring students to earn 12 additional credits beyond the 160-credit requirement.

The Board of Studies (BoS) meeting of the Department of Basic Sciences and Humanities (Mathematics) commenced with a welcome note from the Chairperson, who also outlined the key resolutions made in the earlier BoS meeting held on 3rd August 2024, which finalized the course structure and syllabi of the 1st year. The Chairperson further requested the Board to deliberate on the course structure and syllabi for the 2nd, and 4th years and approve the proposed modifications.

After a detailed and constructive discussion on the revised syllabus for the B.Tech and M.Tech programs under R-24 regulations, the Board collectively agreed to implement the proposed courses across various B.Tech and M.Tech programs.

The Board unanimously resolved the following:

Item-1 : Approval of the syllabus for the courses offered to II year of B.Tech Program

Resolution No: GVPCEW(A)/BOS-2/ BOS/MATHEMATICS-BS&H/2025/1

It is resolved to recommend to the Academic Council that the following courses offered for B.Tech Program to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Complex Variables and Statistical Methods" offered to the EEE branch in the II year I Semester – Annexure-I.
2. The proposed syllabus for the course titled "Complex and Fourier Analysis" offered to the ECE branch in the II year I Semester – Annexure-II.
3. The proposed syllabus for the course titled "Discrete Mathematical Structures" offered to the CSE, CSE[AI-ML], IT branches in the II year I Semester – Annexure-III.
4. The proposed syllabus for the course titled "Probability and Statistics" offered to the CSE, CSE[AI-ML], IT branches in the II year II Semester – Annexure-IV.

Item-2: Approval of the syllabus for the course offered under HSS Elective for IV year of B.Tech Program

Resolution No: GVPCEW(A)/BOS-2/ BOS/MATHEMATICS-BS&H/2025/2

It is resolved to recommend to the Academic Council that the following HSS Elective course offered for all B.Tech Programs to be effective from 2024 admitted batch onwards for approval

1. The proposed syllabus for the course titled "Operations Research" offered to ECE, EEE, CSE, CSE [AI-ML], IT branches in the IV year I Semester – Annexure-V

Item-3 : Approval of the syllabus for the course offered under Open elective course for III semester of M.Tech Program

Resolution No: GVPCEW(A)/BOS-2/ BOS/MATHEMATICS-BS&H/2025/3

It is resolved to recommend to the Academic Council that the following Elective course offered for M.Tech Program to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Optimization Techniques" offered to M.Tech CSE (Data Science) & ECE (VLSI Design and Embedded Systems) Program in the III Semester – Annexure-VI.

The Board Members unanimously authorize the Chairperson to make minor modifications in the title/content of a course if necessary.

The meeting concluded by thanking all the members.

Members Present:

Name of the Member	Designation	Signature
Prof. K L Sai Prasad	Chairperson, BoS and Head, Dept of BSH	
Prof. G. Sudheer	Professor, Vice Principal	
Dr. A. Suseelatha	Assistant Professor	
Dr. B. Bharathi	Assistant Professor	
Dr. A. Kameswara Rao	Assistant Professor	
Mr. SSVD Prakash Vepa	Assistant Professor	
Dr. T Poorna Kantha	Assistant Professor	
Ms. D S S S Ranjani	Assistant Professor	
Prof P A Lakshmi Narayana	Subject Expert	
Prof. K N S Kasi Viswanadham	Subject Expert	
Prof. Ch. Santhi Sundar Raj	Vice Chancellor's Nominee	
Dr. A R J Srikanth	Industry Representative	
Anitha Chiluvuri	College Alumni	-
Mr. Anil Kumar Paluri	Expert for Special Courses	

Chairperson , BoS

HEAD
DEPARTMENT OF
BASIC SCIENCES & HUMANITIES
GVP COLLEGE OF ENGINEERING FOR WOMEN
MADHURAWADA VISAKHAPATNAM 530 048

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous)

(Approved by AICTE, New Delhi and Permanently Affiliated to Andhra University, Visakhapatnam)
Madhurawada :: Visakhapatnam – 530 048

DEPARTMENT OF PHYSICS - BS&H

Minutes of 1st meeting of the Board of Studies in Physics- BS&H department on 3rd August 2024 (Saturday) at 1 PM in hybrid mode.

The meeting of the Board of Studies in Physics- BS&H department of Gayatri Vidya Parishad College of Engineering for Women (Autonomous) is held on 3rd August 2024 (Saturday) from 1 PM onwards to finalize the syllabi of the first year (1st semester and 2nd semester) courses of all B.Tech Programs offered by the Department of Physics- BS&H under the regulations R – 2024 from the academic year 2024-25 onwards.

Members Present:

Dr K L Sai Prasad - Chairperson

External Members:

1	Dr G Padmaja Rani Professor, Dept of Physics JNTU-K, Kakinada	Subject Expert	ONLINE
2	Dr R Arun Kumar, Assistant Professor, Dept of Physics NIT-AP, Andhra Pradesh	Subject Expert	ONLINE
3	Dr S Srinivasa Rao, Professor, Dept of Physics AU College of Science and Technology, Andhra University, Visakhapatnam	Vice Chancellor's Nominee	
4	Dr Y Purushotham, Scientist Centre for Materials for Electronics Technology (C-MET), Hyderabad	Industry Representative	
5	Ms K Hrudaya, Team Lead, CAPGEMINI	College Alumni	
6	Dr K V Ramesh, Professor, Dept of Physics GITAM University, Visakhapatnam	Expert for Special Courses	

Internal Members:

1	Dr V S Jahnavi	Member	medical leave
2	Mr V V V Satyanarayana	Member	
3	Dr Ch S Lakshmi	Member	
4	Dr B Rajesh Babu	Member	

The meeting started with a welcome note by the Principal & Chairman, Academic Council wherein the salient features of the regulations R-2024 was highlighted to joint Board of Studies. Next, the Principal requested the different Department Board Chairmen/Chairpersons to discuss and approve the proposed syllabi of the first year courses under R – 2024 regulations offered for various B.Tech Programs from the academic year 2024-25.

The Board of Studies meeting of the Department of Physics – BS&H started with a welcome note by the Chairperson wherein she presented a outline of the regulations R-2024 and requested the Board to discuss and approve the proposed syllabi.

After serious and fruitful deliberations on the proposed syllabi of the courses under R – 2024 regulations offered by the Department of Physics – BS&H for B.Tech Programs from the academic year 2024-25 onwards, the Board agreed to offer courses for different B.Tech programs as requested by the Chairperson of the respective BoS of other Engineering Departments. The Board unanimously resolved the following:

Resolution No: GVPCEW(A)/BOS/ PHYSICS-BS&H/2024/1

It is resolved to recommend to the Academic Council that the following courses offered for B. Tech Programs to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "ENGINEERING PHYSICS" offered to the branches **ECE, EEE & CSE[AI&ML]** in the I year I Semester – Annexure-1
2. The proposed syllabus for the course titled "ENGINEERING PHYSICS LAB" offered to the branches **ECE, EEE & CSE[AI&ML]** in the I year I Semester – Annexure-2
3. The proposed syllabus for the course titled "ENGINEERING PHYSICS" offered to the branches **CSE & IT** in the I year II Semester – Annexure-3
4. The proposed syllabus for the course titled "ENGINEERING PHYSICS LAB" offered to the branches **CSE & IT** in the I year II Semester – Annexure-4

Resolution No: GVPCEW(A)/BOS/PHYSICS-BS&H/2024/2

The Board Members unanimously authorize the Chairperson to make minor modifications in the title/content of a course if necessary.

The meeting concluded by thanking all the members.

Members Present:

Name of the Member	Designation	Signature
Dr K.L. SAI PRASAD	Chairman, BoS and Head, Dept of BS&H	
Dr V S Jahnavi	Member - Faculty	Medical Leave
Mr V V V Satyanarayana	Member - Faculty	
Dr Ch S Lakshmi	Member - Faculty	
Dr B Rajesh Babu	Member - Faculty	
Dr G Padmaja Rani	Subject Expert	ONLINE
Dr R Arun Kumar	Subject Expert	ONLINE
Dr S Srinivasa Rao	Vice Chancellor's Nominee	
Dr Y Purushotham	Industry Representative	
Ms K Hrudaya	College Alumni	
Dr K V Ramesh	Expert for Special Courses	

Chairperson , BoS

DEPARTMENT OF BASIC SCIENCE& HUMANITIES-ENVIRONMENTAL SCIENCE

Minutes of 2nd meeting of the Board of Studies in Chemistry, Department of Basic Science & Humanities on 29rd March 2025 (Saturday) at 11.00 AM in hybrid mode.

The meeting of the Board of Studies in Chemistry – BS & H department of Gayatri Vidya Parishad College of Engineering for Women (Autonomous) is held on 29rd March 2025 (Saturday) from 11.00 AM onwards to finalize the syllabi of the second year (1st semester and 2nd semester) course of all B. Tech Programs offered by the Department of Chemistry- Basic Science & Humanities under the regulations R-2024 from the academic year 2024-25 onwards.

Members Present:

Dr. K. L. Sai Prasad - Chairperson

External Members:

1	Dr. Someswara Rao S Associate Professor Department of Chemistry IIT-Tirupathi	Subject Expert	on line
2	Dr. Suresh Babu Kalidindi Associate Professor Department of Chemistry Central Tribal University of AP, Vizianagaram	Subject Expert	on line
3	Prof. K. Basavaiah Department of Chemistry College of Science & Technology Andhra University Visakhapatnam	Vice-Chancellor's Nominee	offline
4	Ms. M Santhoshi Rupa Associate Manager Department of Manufacturing Compliance Pfizer Health Care India Pvt Ltd Lemarthy Village, Parawada Mandal Visakhapatnam	Industry Representative	offline
5	Ms. Syed Suhana Amazon Web Services Bangalore	College Alumni	off-line
6	Mr.Akasapu Raviteja Senior Chemist Titanish Laboratories, Chodavaram Vizianagram	Expert for Special Courses	off-line

Internal Members:

1	Dr. Prava Rani Nanda Assistant Professor Department of Chemistry GVPCEW (A)	Faculty Members of the Department	Offline
2	Dr. P. Srinivasa Rao Assistant Professor Department of Chemistry GVPCEW (A)	Faculty Members of the Department	Off-line
3	Mr. S. Ashok Assistant Professor Department of Chemistry GVPCEW (A)	Faculty Members of the Department	Off-line

The meeting commenced with the Principal & Chairman, Academic Council, welcoming the members of Board of Studies of different departments and requested to frame the syllabus in accordance with the guidelines of NEP-2020 and the industry standards.

Following this, the Principal informed the members about the amendment made to the Academic Rules and Regulations (R-24) for B. Tech Programs in accordance with AICTE recommendations during the Academic Council meeting held on 26.10.2024.

The amendment pertains to the B. Tech Program regulations at GVPCEW(A), effective from the 2024-25 admitted batch. As per Section 17 (A-ii) of the Academic Rules & Regulations (R-24), the previous requirement for earning a B. Tech Degree with a Minor was to complete 12 credits within the 160-credit framework of the B. Tech program. This condition has now been revised, requiring students to earn 12 additional credits beyond the 160-credit requirement.

The Board of Studies (BoS) meeting of the Department of Electronics and Communication Engineering commenced with a welcome note from the Chairperson, who also outlined the key resolutions made in the earlier BoS meeting held on 3rd August 2024, which finalized the course structure and syllabi of the 1st year. The Chairperson further requested the Board to deliberate on the course structure and syllabi for the 2nd, 3rd, and 4th years and approve the proposed modifications.

After a detailed and constructive discussion on the revised syllabus for the B.Tech program under R-24 regulations, the Board collectively agreed to implement the proposed courses across various B.Tech programs.

The Board unanimously resolved the following

Item-1:

Resolution No: GVPCEW(A)/BOS-2/Chemistry-BS&H/2025/1

It is resolved to recommend to the Academic Council that the following courses offered for B. Tech Programs to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Environmental Science"offered to the CSE & IT branch in the II year I Semester – Annexure-I.

2. The proposed syllabus for the course titled "Environmental Science" offered to the EEE, ECE & CSE (AI&ML) branch in the II year II Semester – Annexure-II.

Name of the Member	Designation	Signature
Dr. K. L. Sai Prasad	Chairperson, BoS and Head, Dept. of BS&H	
Mr. S. Ashok	Assistant Professor	
Dr. Prava Rani Nanda	Assistant Professor	
Dr. P. Srinivasa Rao	Assistant Professor	
Dr. S. Someswara Rao	Subject Expert	–
Dr. Suresh Babu Kalidindi	Subject Expert	–
Prof. K. Basavaiah	Vice Chancellor's Nominee	
Ms. M. Santhoshi Rupa	Industry Representative	
Ms. Syed Suhana	College Alumni	
Mr. Akasapu Raviteja	Expert for Special Courses	

Chairperson, BoS

HEAD
DEPARTMENT OF
BASIC SCIENCES & HUMANITIES
GVP COLLEGE OF ENGINEERING FOR WOMEN
ADHURAWADA VISAKHAPATNAM

Members Present:

Name of the Member	Designation	Signature
Dr. K. L. Sai Prasad	Chairperson, BoS and Head, Dept. of BS&H	
Mr. S. Ashok	Assistant Professor	
Dr. Prava Rani Nanda	Assistant Professor	
Dr. P. Srinivasa Rao	Assistant Professor	
Dr. S. Someswara Rao	Subject Expert	S. Someswara Rao
Dr. Suresh Babu Kalidindi	Subject Expert	
Prof. K. Basavaiah	Vice Chancellor's Nominee	
Ms. M. Santhoshi Rupa	Industry Representative	
Ms. Syed Suhana	College Alumni	
Mr. Akasapu Raviteja	Expert for Special Courses	

Chairperson, BoS

HEAD
DEPARTMENT OF
BASIC SCIENCES & HUMANITIES

Members Present

Name of the Member	Designation	Signature
Dr. K. L. Sai Prasad	Chairperson, BoS and Head, Dept. of BS&H	
Mr. S. Ashok	Assistant Professor	
Dr. Prava Rani Nanda	Assistant Professor	
Dr. P. Srinivasa Rao	Assistant Professor	
Dr. S. Someswara Rao	Subject Expert	
Dr. Suresh Babu Kalidindi	Subject Expert	Seresh
Prof. K. Basavaiah	Vice Chancellor's Nominee	
Ms. M. Santhoshi Rupa	Industry Representative	
Ms. Syed Suhana	College Alumni	
Mr. Akasapu Raviteja	Expert for Special Courses	

Chairperson, BoS

HEAD
DEPARTMENT OF
BASIC SCIENCES & HUMANITIES
SVR COLLEGE OF ENGINEERING FOR WOMEN

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN

(Autonomous)

(Approved by AICTE, New Delhi and Permanently Affiliated to Andhra University, Visakhapatnam)

Madhurawada :: Visakhapatnam – 530 048

DEPARTMENT OF ENGLISH- BS&H

Minutes of 2nd meeting of the Board of Studies in English, Department of Basic sciences and Humanities held on 3rd April 2025 (Thursday) at 9.00 a.m in hybrid mode.

The meeting of the Board of Studies in English - Department of Basic sciences and Humanities, Gayatri Vidya Parishad College of Engineering for Women (Autonomous) is held on 3rd April 2025 (Thursday) from 9.00 a.m onwards to finalize the syllabi of the Third year (1st semester and 2nd semester) course of all B. Tech. programs offered by the Department of English- Basic sciences and Humanities under the regulations R-2024 from the academic year 2024-25 onwards.

Members Present:

Dr. K. L. Sai Prasad - Chairperson

External Members:

1	Dr. G Survana Lakshmi Professor, Dept of ELT School of English Language Education, EFL University, Hyderabad	Subject Expert	ONLINE
2	Dr. Chandreie Mukherjee Assistant Professor IIM Visakhapatnam	Subject Expert	OFFLINE
3	Dr. N Solomon Benny Dept. of English, College of Arts & Commerce AU College of Engineering, Visakhapatnam	Vice Chancellor's Nominee	N.S. Benny OFFLINE
4	Ms. Shameem Bhanu Executive Business Administrator, The Quantum AI	Industry Representative	ONLINE
5	Ms. Sai Sindhura Kuppili Gudiewire Developer PWC	College Alumni	ONLINE
6	Mr. Prasad Boya Director – Operations Quantum AI, Hi-tech City Hyderabad	Expert for Special Courses	ONLINE

Internal Members:

1	Dr. Ch. Alekya	Assistant Professor	Offline
2	Dr. V. V.L. Usha Ramani	Assistant Professor	Offline
3	Ms. B. Ramadevi	Assistant Professor	Offline

The meeting commenced with the Principal & Chairman, Academic Council, welcoming the members of Board of Studies of different departments and requested them to frame the syllabus in accordance with the guidelines of NEP-2020 and the industry standards.

Following this, the Principal informed the members about the amendment made to the Academic Rules and Regulations (R-24) for B. Tech. Program in accordance with AICTE recommendations during the Academic Council meeting held on 26.10.2024.

The amendment pertains to the B. Tech. Program regulations at GVPCEW (A), effective from the 2024-25 admitted batch. As per Section 17 (A-ii) of the Academic Rules & Regulations (R-24), the previous requirement for earning a B. Tech. Degree with a Minor was to complete 12 credits within the 160-credit framework of the B. Tech. program. This condition has now been revised, requiring students to earn 12 additional credits beyond the 160-credit requirement.

The Board of Studies (BoS) meeting of the Department of English (Basic Sciences and Humanities) commenced with a welcome note from the Chairperson, who also outlined the key resolutions made in the earlier BoS meeting held on 3rd August 2024, which finalized the course structure and syllabi of the 1st year. The Chairperson further requested the Board to deliberate on the course structure and syllabi for the 3rd year and approve the proposed modifications.

After a detailed and constructive discussion on the revised syllabus for the B.Tech program under R-24 regulations, the Board collectively agreed to implement the proposed course across various B. Tech programs.

The Board unanimously resolved the following:

Item-1: Approval of syllabus of III B.Tech Program

Resolution No: GVPCEW(A)/BOS-2/BS&H/ENGLISH/2025/1

It is resolved to recommend to the Academic Council that the following course offered for B. Tech. program to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Soft Skills" offered to the CSE(AI-ML), ECE , EEE Branches in the III year I Semester – Annexure-I
2. The proposed syllabus for the course titled "Soft Skills " offered to the CSE, IT Branches in the III year II Semester – Annexure-II

Resolution No: GVPCEW(A)/BOS/BS&H/ENGLISH/2025/2

The Board Members unanimously authorize the Chairperson to make minor modifications in the title/content of a course if necessary.

The meeting concluded by thanking all the members.

Members Present:

Name of the Member	Designation	Signature
Dr. K. L. Sai Prasad	Chairman, BoS and Head, Dept of BS&H	
Faculty-1	Dr. Ch. Alekya	
Faculty-2	Dr.V.V.L.Usha Ramani	
Faculty-3	Ms.B.Ramadevi	
Dr.G Survana Lakshmi	Subject Expert	ONLINE
Dr.Chandreie Mukherjee	Subject Expert	
Dr. N Solomon Benny	Vice Chancellor's Nominee	
Ms. Shameem Bhanu	Industry Representative	ONLINE
Ms. Sai Sindhura Kuppili	College Alumni	ONLINE
Mr. Prasad Boya	Expert for Special Courses	ONLINE

Chairperson, BoS

HEAD
DEPARTMENT OF
BASIC SCIENCES & HUMANITIES
GVP COLLEGE OF ENGINEERING FOR WOMEN
MADHURAWADA, VISAKHAPATNAM-530 048

Members Present:

Name of the Member	Designation	Signature
Dr. K. L. Sai Prasad	Chairman, BoS and Head, Dept of BS&H	—
Faculty-1	Dr. Ch. Alekya	—
Faculty-2	Dr.V.V.L.Usha Ramani	—
Faculty-3	Ms.B.Ramadevi	—
Dr.G Survana Lakshmi	Subject Expert	G. Survana Lakshmi
Dr.Chandreie Mukherjee	Subject Expert	—
Dr. N Solomon Benny	Vice Chancellor's Nominee	—
Ms. Shameem Bhanu	Industry Representative	—
Ms. Sai Sindhura Kuppili	College Alumni	—
Mr. Prasad Boya	Expert for Special Courses	—

Chairperson, BoS

HEAD
DEPARTMENT OF
BASIC SCIENCES & HUMANITIES
GVP COLLEGE OF ENGINEERING FOR WOMEN
ADHURAWADA, VISAKHAPATNAM-530 040

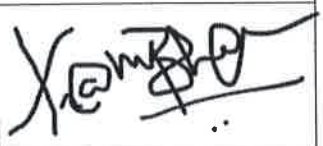
Members Present:

Name of the Member	Designation	Signature
Dr.K L Sai Prasad	Chairman, BoS and Head, Dept of BS&H	—
Faculty-1	Dr.Ch.Alekya	—
Faculty-2	Dr.V.V.L.Usha Ramani	—
Faculty-3	Ms.B.Ramadevi	—
Dr.G Survana Lakshmi	Subject Expert	—
Dr.Chandreie Mukherjee	Subject Expert	—
Dr. N Solomon Benny	Vice Chancellor's Nominee	—
Ms. Shameem Bhanu	Industry Representative	—
Ms. Sai Sindhura Kuppili	College Alumni	K Sai Sindhura
Mr. Prasad Boya	Expert for Special Courses	—

Chairman , BoS

HEAD
DEPARTMENT OF
BASIC SCIENCES & HUMANITIES
V.R.S. COLLEGE OF ENGINEERING FOR WOMEN

Members Present:

Name of the Member	Designation	Signature
Dr. K. L. Sai Prasad	Chairman, BoS and Head, Dept of BS&H	—
Faculty-1	Dr. Ch. Alekya	—
Faculty-2	Dr.V.V.L.Usha Ramani	—
Faculty-3	Ms.B.Ramadevi	—
Dr.G Survana Lakshmi	Subject Expert	—
Dr.Chandreie Mukherjee	Subject Expert	—
Dr. N Solomon Benny	Vice Chancellor's Nominee	—
Ms. Shameem Bhanu	Industry Representative	
Ms. Sai Sindhura Kuppili	College Alumni	—
Mr. Prasad Boya	Expert for Special Courses	—



Chairperson, BoS

HEAD
DEPARTMENT OF
BASIC SCIENCES & HUMANITIES
GVP COLLEGE OF ENGINEERING FOR WOMEN
MADHURAWADA, VISAKHAPATNAM-530 048

Members Present:

Name of the Member	Designation	Signature
Dr.K L Sai Prasad	Chairman, BoS and Head, Dept of BS&H	
Faculty-1	Dr.Ch.Alekya	
Faculty-2	Dr.V.V.L.Usha Ramani	
Faculty-3	Ms.B.Ramadevi	
Dr.G Survana Lakshmi	Subject Expert	
Dr.Chandreie Mukherjee	Subject Expert	
Dr. N Solomon Benny	Vice Chancellor's Nominee	
Ms. Shameem Bhanu	Industry Representative	
Ms. Sai Sindhura Kuppili	College Alumni	
Mr. Prasad Boya	Expert for Special Courses	

Chairman , BoS

HEAD
DEPARTMENT OF
BASIC SCIENCES & HUMANITIES
G V P COLLEGE OF ENGINEERING FOR WOMEN

DEPARTMENT OF MANAGEMENT STUDIES- BS & H

Minutes of the meeting of the Board of Studies in Management Studies, department of Basic Science and Humanities held on 29th March, 2025 (Saturday) at 10:00AM in hybrid mode.

The meeting of the Board of Studies in Management Studies- Basic Science and Humanities department of Gayatri Vidya Parishad College of Engineering for Women (Autonomous) is held on 29th March, 2025 (Saturday) from 10:00AM to finalize the syllabi of the 2nd, 3rd and 4th year (1st semester and 2nd semester) courses of all B.Tech Programs and 3rd semester courses of M.Tech programs offered by the Department of Management Studies- Basic Science and Humanities under the regulations R - 2024 from the academic year 2024-25 onwards.

Members Present:

Dr. K. L. Sai Prasad - Chairperson:

External Members:

1	Dr. A. Narasimha Rao Professor Department of Commerce and Management Studies Andhra University, South Campus, Waltair Junction, Visakhapatnam, Andhra Pradesh, India – 530003 Ph. No. 98483 77644 Email: addada@rediff.com	Subject Expert	offline
2	Dr.P. Venkata Rao Professor GVP College of Engineering (A) Visakhapatnam, Andhra Pradesh PIN:530 048, 8885043433 pvenkataro@gvpce.ac.in	Subject Expert	offline
3	Prof. P Venkateswarlu Dept of Commerce & Management Studies College of Arts & Commerce Andhra University, Visakhapatnam	Vice Chancellor's Nominee	offline
4	Sri P Rama Krishna IIM Udaipur Founder, Think plus.	Industry Representative	offline
5	Tsapala Srujana TCS Human Resource Business Partner	College Alumni	online.
6	Dr.K.V.V. Murali Someswararao Professor GVP college for Degree and PG courses	Expert for Special Courses	

Internal Members:

1	Ms. K. Vallisri KrishnaVeni	Assistant Professor	Offline
2	Dr.R.Neelima	Assistant Professor	Offline

The meeting commenced with the Principal & Chairman, Academic Council, welcoming the members of Board of Studies of different departments and requested them to frame the syllabus in accordance with the guidelines of NEP-2020 and the industry standards.

Following this, the Principal informed the members about the amendment made to the Academic Rules and Regulations (R-24) for B.Tech & M.Tech Programs in accordance with AICTE recommendations during the Academic Council meeting held on 26.10.2024.

The amendment pertains to the B.Tech Program regulations at GVPCEW(A), effective from the 2024-25 admitted batch. As per Section 17 (A-ii) of the Academic Rules & Regulations (R-24), the previous requirement for earning a B.Tech Degree with a Minor was to complete 12 credits within the 160-credit framework of the B.Tech program. This condition has now been revised, requiring students to earn 12 additional credits beyond the 160-credit requirement.

The Board of Studies (BoS) meeting of the department of Management Studies (Basic Science and Humanities) commenced with a welcome note from the Chairperson, who also outlined the key resolutions made in the earlier BoS meeting held on 3rd August 2024, which finalized the course structure and syllabi of the 1st year. The Chairperson further requested the Board to deliberate on the course structure and syllabi for the 2nd, 3rd, and 4th years and approve the proposed modifications.

After a detailed and constructive discussion on the revised syllabus for the B.Tech and M.Tech programs under R-24 regulations, the Board collectively agreed to implement the proposed courses across various B.Tech and M.Tech programs.

The Board unanimously resolved the following:

Item-1 : Approval of syllabus of II, III & IV B.Tech Program

Resolution No: GVPCEW(A)/BOS/MANAGEMENT STUDIES-BS&H/2025/1

It is resolved to recommend to the Academic Council that the following courses offered for B.Tech Programs to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Managerial Economics " offered to the CSE-(AIML) branch in the II year I Semester – Annexure-I

2. The proposed syllabus for the course titled "Managerial Economics " offered to the CSE, ECE, EEE,IT branch in the II year II Semester – Annexure-II

Item-2 : Approval of syllabus of B.Tech Program for HSS Electives

Resolution No: GVPCEW(A)/BOS/MANAGEMENT STUDIES-BS&H/2025/2

It is resolved to recommend to the Academic Council that the following courses offered for B.Tech Programs to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Accounting and Finance for Engineers" offered to the CSM,CSE, ECE, EEE, IT branch in the IV year I Semester – Annexure-III
2. The proposed syllabus for the course titled "Human Relations at work" offered to the CSM,CSE, ECE, EEE, IT branch in the IV year I Semester – Annexure-IV

3. The proposed syllabus for the course titled "Industrial Management and Startup Eco System" offered to the CSM,CSE, ECE, EEE, IT branch in the IV year I Semester – Annexure-V
4. The proposed syllabus for the course titled "Organizational Behavior" offered to the CSM,CSE, ECE, EEE, IT branch in the IV year I Semester – Annexure-VI

Item-3 : Approval of syllabus of B.Tech Program for Mandatory Courses

Resolution No: GVPCEW(A)/BOS/MANAGEMENT STUDIES-BS&H/2025/3

It is resolved to recommend to the Academic Council that the following courses offered for B.Tech Programs to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Professional Ethics and Universal Human Values" offered to the CSM, ECE, EEE branch in the II year I Semester – Annexure-VII
2. The proposed syllabus for the course titled "Professional Ethics and Universal Human Values" offered to the CSE, IT branch in the II year I Semester – Annexure-VIII
3. The proposed syllabus for the course titled "Intellectual Property Rights and Patents" offered to the ECE, EEE branch in the III year I Semester – Annexure-IX
4. The proposed syllabus for the course titled "Intellectual Property Rights and Patents" offered to the CSE, CSM, IT branch in the III year II Semester – Annexure-X

Item-4: Approval of syllabus of 3rd Semester M.Tech Open Elective

Resolution No: GVPCEW(A)/BOS/MANAGEMENT STUDIES-BS&H/2025/4

It is resolved to recommend to the Academic Council that the following courses offered for M.Tech ECE (VLSI Design & Embedded Systems) & CSE (Data Science) Programs to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Cost Management of Engineering Projects" offered to the ECE (VLSI Design & Embedded Systems) & CSE (Data Science) branches in the **3rd Semester**– Annexure-XI
2. The proposed syllabus for the course titled "Business Analytics" offered to the ECE (VLSI Design & Embedded Systems) & CSE (Data Science) branches in the **3rd Semester**– Annexure-XII

Resolution No: GVPCEW(A)/BOS/MANAGEMENT STUDIES-BS&H/2025/5

The Board Members unanimously authorize the Chairperson to make minor modifications in the title/content of a course if necessary.

The meeting concluded by thanking all the members.

Members Present:

Name of the Member	Designation	Signature
Dr.K.L.Sai Prasad	Chairperson, BoS and Head, Dept of BS&H	
Ms. K.Vallisri KrishnaVeni	Assistant Professor	
Dr. R.Neelima	Assistant Professor	
Dr. V.Siva Jahnavy	Assistant Professor	
Dr. Rani Prava Nanda	Assistant Professor	
Dr.A.Narasimha Rao	Subject Expert	
Dr.P.Venkata Rao	Subject Expert	
Prof. P. Venkateswarlu	Vice Chancellor's Nominee	
Sri P. Rama Krishna	Industry Representative	
Ms.Tsapala Srujana	College Alumni	
Dr.K.V.V.Murali Someswararao	Expert for Special Courses	

Chairperson , BoS

HEAD
DEPARTMENT OF
BASIC SCIENCES & HUMANITIES
GVP COLLEGE OF ENGINEERING FOR WOMEN
MADHURAWADA, VISAKHAPATNAM-530 048

Members Present:

Name of the Member	Designation	Signature
Dr.K.L.Sai Prasad	Chairperson, BoS and Head, Dept of BS&H	
Ms. K.Vallisri KrishnaVeni	Assistant Professor	
Dr. R.Neelima	Assistant Professor	
Dr. V.Siva Jahnavy	Assistant Professor	
Dr. Rani Prava Nanda	Assistant Professor	
Dr.A.Narasimha Rao	Subject Expert	
Dr.P.Venkata Rao	Subject Expert	
Prof. P. Venkateswarlu	Vice Chancellor's Nominee	
Sri P. Rama Krishna	Industry Representative	
Ms.Tsapala Srujana	College Alumni	
Dr.K.V.V.Murali Someswararao	Expert for Special Courses	

Chairperson , BoS

HEAD
DEPARTMENT OF
BASIC SCIENCES & HUMANITIES
G V P COLLEGE OF ENGINEERING FOR WOMEN
MADHURAWADA, VISAKHAPATNAM-530 048

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN

(Autonomous)

(Approved by AICTE, New Delhi and Permanently Affiliated to Andhra University, Visakhapatnam)

Madhurawada :: Visakhapatnam – 530 048

DEPARTMENT OF MATHEMATICS – BS&H

Minutes of 1st meeting of the Board of Studies in the Department of Mathematics -BS&H on 3rd August 2024(Saturday) at 1 PM.

The meeting of the Board of Studies in the Department of Mathematics – BS&H of Gayatri Vidya Parishad College of Engineering for Women (Autonomous) is held on 3rd August 2024(Saturday) from 1 PM onwards to finalize the syllabi of the first year (1st semester and 2nd semester) courses of all B.Tech Programs offered by the Department of Mathematics under the regulations R – 2024 from the academic year 2024-25 onwards.

Members Present:

Dr K L Sai Prasad - Chairperson

External Members:

1	Prof P A Lakshmi Narayana Professor, Dept of Mathematics IIT – Hyderabad	Subject Expert	Offline
2	Prof. K N S Kasi Viswanadham Professor, Dept of Mathematics NIT - Warangal	Subject Expert	Offline
3	Prof. Ch. Santhi Sundar Raj Dept of Engineering Mathematics AU College of Engineering (A) Visakhapatnam	Vice Chancellor's Nominee	Offline
4	Dr. A R J Srikanth Director Databrew Technologies Pvt Ltd	Industry Representative	Offline
5	Anitha Chiluvuri Senior Member of Technical Staff (SMTS) Oracle	College Alumni	Offline
6	Mr. Anil Kumar Paluri Assistant Vice President Bank of America	Expert for Special Courses	Offline.

Internal Members:

1	Prof. G. Sudheer	Professor, Vice Principal	offline
2	Dr. A. Suseelatha	Assistant Professor	offline
3	Ms. B. Bharathi	Assistant Professor	offline
4	Dr. A. Kameswara Rao	Assistant Professor	offline
5	Mr. SSVD Prakash Vepa	Assistant Professor	offline
6	Dr. T Poorna Kantha	Assistant Professor	offline
7	Ms. D S S S Ranjani	Assistant Professor	offline

The meeting started with a welcome note by the Principal & Chairman, Academic Council wherein the salient features of the regulations R-2024 was highlighted to joint Board of Studies. Next, the Principal requested the different Department Board Chairmen/Chairpersons to discuss and approve the proposed syllabi of the first year courses under R – 2024 regulations offered for various B.Tech Programs from the academic year 2024-25.

The Board of Studies meeting of the Department of Mathematics - BS&H started with a welcome note by the Chairperson wherein he presented a outline of the regulations R-2024 and requested the Board to discuss and approve the proposed syllabi.

After serious and fruitful deliberations on the proposed syllabi of the courses under R – 2024 regulations offered by the Department of Mathematics – BS&H for B.Tech Programs from the academic year 2024-25 onwards, the Board agreed to offer courses for different B.Tech programs as requested by the Chairperson of the respective BoS of other Engineering Departments. The Board unanimously resolved the following:

Resolution No: GVPCEW(A)/BOS/MATHEMATICS-BS&H/2024/1

It is resolved to recommend to the Academic Council that the following courses offered for B.Tech Programs to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Calculus and Differential Equations" offered to the CSE, CSE (AI-ML), IT, ECE, EEE branches in the I year I Semester - Annexure-1.
2. The proposed syllabus for the course titled "Linear Algebra and Vector Calculus" offered to the CSE, CSE (AI-ML), IT, ECE, EEE branches in the I year II Semester – Annexure-2.

Resolution No: GVPCEW(A)/BOS/MATHEMATICS-BS&H/2024/2

The Board Members unanimously authorize the Chairperson to make minor modifications in the title/content of a course if necessary.

The meeting concluded by thanking all the members.

Members Present:

Name of the Member	Designation	Signature
Dr K L Sai Prasad	Chairperson, BoS and Head, Dept of BSH	
Prof. G. Sudheer	Professor, Vice Principal	
Dr. A. Suseelatha	Assistant Professor	
Ms. B. Bharathi	Assistant Professor	
Dr. A. Kameswara Rao	Assistant Professor	
Mr. SSVD Prakash Vepa	Assistant Professor	
Dr. T Poorna Kantha	Assistant Professor	
Ms. D S S S Ranjani	Assistant Professor	
Prof P A Lakshmi Narayana	Subject Expert	
Prof. K N S Kasi Viswanadham	Subject Expert	
Prof. Ch. Santhi Sundar Raj	Vice Chancellor's Nominee	
Dr. A R J Srikanth	Industry Representative	
Anitha Chiluvuri	College Alumni	
Mr. Anil Kumar Paluri	Expert for Special Courses	

Chairperson, BoS

HEAD
DEPARTMENT OF
BASIC SCIENCES & HUMANITIES
GVP COLLEGE OF ENGINEERING (A)
MADHURAWADA VISAKHAPATNAM

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous)

(Approved by AICTE, New Delhi and Permanently Affiliated to Andhra University, Visakhapatnam)
Madhurawada :: Visakhapatnam – 530 048

DEPARTMENT OF ENGLISH- BS& H

Minutes of 1st meeting of the Board of Studies in the Department of English- BS& H on 3rd August 2024, Saturday at 1 PM in hybrid mode.

The meeting of the Board of Studies in the Department of English- BS& H of Gayatri Vidya Parishad College of Engineering for Women (Autonomous) is held on 3rd August 2024,Saturday from 1 PM onwards to finalize the syllabi of the first year (1st semester and 2nd semester) courses of all B.Tech Programs offered by the Department of English- BS& H under the regulations R – 2024 from the academic year 2024-25 onwards.

Members Present:

Dr.K L Sai Prasad - Chairperson

External Members:

1	Dr.G Survana Lakshmi Professor, Dept of ELT School of English Language Education, EFL University, Hyderabad	Subject Expert	G. Survana Lakshmi OFFLINE
2	Dr.Chandreie Mukherjee Assistant Professor IIM Visakhapatnam	Subject Expert	Chandreie Mukherjee OFFLINE
3	Dr. N Solomon Benny Dept of English, College of Arts &Commerce AU College of Engineering, Visakhapatnam	Vice Chancellor's Nominee	N.S. Benny OFFLINE
4	Ms. Shameem Bhanu Executive Business Administrator, The Quantum AI	Industry Representative	ONLINE
5	Ms. Sai Sindhura Kuppili Gudiewire Developer PWC	College Alumni	OFFLINE
6	Mr. Prasad Boya Director – Operations Quantum AI, Hi-tech City Hyderabad	Expert for Special Courses	ONLINE

Internal Members:

1	Dr.Ch.Alekya	Assistant Professor, English, Department of BS&H	OFFLINE
2	Dr.V.V.L.Usha Ramani	Assistant Professor, English, Department of BS&H	OFFLINE
3	Ms.B.Rama Devi	Assistant Professor, English, Department of BS&H	ABSENT

The meeting started with a welcome note by the Principal & Chairperson, Academic Council wherein the salient features of the regulations R-2024 were highlighted to joint Board of Studies. Next, the Principal requested the different Department Board Chairmen/Chairpersons to discuss and approve the proposed syllabi of the first year courses under R – 2024 regulations offered for various B.Tech Programs from the academic year 2024-25.

The Board of Studies meeting of the Department of English- BS& H started with a welcome note by the Chairperson. The subject coordinator presented an outline of the regulations R-2024 and requested the Board to discuss and approve the proposed syllabi.

After serious and fruitful deliberations on the proposed syllabi of the courses under R – 2024 regulations offered by the Department of English- BS& H for B.Tech Programs from the academic year 2024-25 onwards, the Board agreed to offer courses for different B.Tech programs as requested by the Chairperson of the respective BoS of Department of Basic Science & Humanities- English . The Board unanimously resolved the following:

Resolution No: GVPCEW(A)/BOS/BS&H/ENGLISH/2024/1

It is resolved to recommend to the Academic Council that the following courses offered for B.Tech Programs to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled 'English(Theory)'offered by the Department of English-BS&H to the Department of CSE & Department of IT in the I year I Semester –Annexure-I

2. The proposed syllabus for the course titled 'Communication Skills Lab' offered by the Department of English-BS&H to the Department of CSE & Department of IT in the I year I Semester –Annexure-II

3. The proposed syllabus for the course titled 'English(Theory)'offered by the Department of English-BS&H to the Department of ECE ,Department of EEE & Department of CSM in the I year II Semester –Annexure-III

4. The proposed syllabus for the course titled 'Communication Skills Lab' offered by the Department of English-BS&H to the Department of ECE ,Department of EEE & Department of CSM in the I year II Semester –Annexure-IV

Resolution No: GVPCEW(A)/BOS/BS&H/ENGLISH/2024/2

The Board Members unanimously authorize the Chairperson to make minor modifications in the title/content of a course if necessary.

The meeting concluded by thanking all the members.

Members Present:

Name of the Member	Designation	Signature
Dr.K L Sai Prasad	Chairman, BoS &Head, Department of BS&H	
Dr.Ch.Alekya	Assistant Professor, English, Department of BS&H	
Dr.V.V.L.Usha Ramani	Assistant Professor, English, Department of BS&H	
Ms.B.Rama Devi	Assistant Professor, English, Department of BS&H	ABSENT
Dr.G Survana Lakshmi	Subject Expert	
Dr.Chandreie Mukherjee	Subject Expert	
Dr. N Solomon Benny	Vice Chancellor's Nominee	
Ms. Shameem Bhanu	Industry Representative	
Ms. Sai Sindhura Kuppili	College Alumni	
Mr. Prasad Boya	Expert for Special Courses	

Chairperson , BoS

HEAD
DEPARTMENT OF
BASIC SCIENCES & HUMANITIES
GVP COLLEGE OF ENGINEERING FOR WOMEN
ADHURAWADA VISAKHAPATNAM-530 048

DEPARTMENT OF CHEMISTRY- BS & H

Minutes of 1st meeting of the Board of Studies in Chemistry, department of BS & H on 3rd August 2024 (Saturday) at 1 PM in hybrid mode.

The meeting of the Board of Studies in Chemistry-BS & H department of Gayatri Vidya Parishad College of Engineering for Women (Autonomous) is held on 3rd August 2024 (Saturday) from 1 PM onwards to finalize the syllabi of the first year (1st semester and 2nd semester) courses of all B. Tech Programs offered by the Department of Chemistry-BS&H, under the regulations R – 2024 from the academic year 2024-25 onwards.

Members Present:

Dr K L Saiprasad - Chairperson

External Members:

1	Subject Experts from outside the College	Dr.Someswara Rao S Associate Professor Department of Chemistry IIT-Tirupathi	(offline)
2	Subject Experts from outside the College	Dr.Suresh Babu Kalidindi Associate Professor Dept of Chemistry Central Tribal University of AP Vizianagaram	(offline)
3	Vice-Chancellor's Nomination	Prof. K Basavaiah Dept of Chemistry College of Science & Technology Andhra University Visakhapatnam	(offline)
4	Industry Representative	Ms. M Santhoshi Rupa Associate Manager Department of Manufacturing Compliance Pfizer Health Care India Pvt Ltd Lemarthy Village, Parawada Mandal Visakhapatnam	(offline)
5	College Alumni	Ms. Syed Suhana Amazon Web Services Bangalore	(offline)
6	Expert from outside the Autonomous College for Special Course	Mr.Akasapu Raviteja Senior Chemist Titanish Laboratories, Chadavaram Vizianagram	(offline)

Internal Members:

1	Dr Prava Rani Nanda	Assistant Professor, Member
2	Mr. S. Ashok	Assistant Professor, Member
3	Dr. P Srinivasa Rao	Assistant Professor, Member

The meeting started with a welcome note by the Principal & Chairman, Academic Council wherein the salient features of the regulations R-2024 was highlighted to joint Board of Studies. Next, the Principal requested the different Department Board Chairmen/Chairpersons to discuss and approve the proposed syllabi of the first year courses under R – 2024 regulations offered for various B. Tech Programs from the academic year 2024-25.

The Board of Studies meeting of the Department of Chemistry-BS & H started with a welcome note by the Chairperson wherein he presented a outline of the regulations R-2024 and requested the Board to discuss and approve the proposed syllabi.

After serious and fruitful deliberations on the proposed syllabi of the courses under R – 2024 regulations offered by the Department of Chemistry-BS & H for B.Tech Programs from the academic year 2024-25 onwards, the Board agreed to offer courses for different B.Tech programs as requested by the Chairperson of the respective BoS of other Engineering Departments. The Board unanimously resolved the following:

Resolution No: GVPCEW(A)/BOS/CHEMISTRY-BS&H/2024/1

It is resolved to recommend to the Academic Council that the following courses offered for B.Tech Programs to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Green Chemistry" offered to the CSE, IT & EEE branches in the I year I Semester – Annexure-1
2. The proposed syllabus for the course titled "Green Chemistry Lab" offered to the EEE branch in the I year I Semester – Annexure-I1
3. The proposed syllabus for the course titled "Green Chemistry" offered to the CSE (AIML) & ECE branches in the I year II Semester – Annexure-1II

Resolution No: GVPCEW(A)/BOS/CHEMISTR-BS&H/2024/2

The Board Members unanimously authorize the Chairperson to make minor modifications in the title/content of a course if necessary.

The meeting concluded by thanking all the members.

Members Present:

Name of the Member	Designation	Signature
Dr K L Saiprasad	Chairperson, BoS and Head, Dept of BS & H	
Dr Prava Rani Nanda,	Assistant Professor	
Mr. S. Ashok	Assistant Professor	
Dr. P Srinivasa Rao	Assistant Professor	
Dr. Someswara Rao S	Subject Expert	
Dr. Suresh Babu Kalidindi	Subject Expert	
Prof. K Basavaiah	Vice Chancellor's Nominee	
Ms. M Santhoshi Rupa	Industry Representative	03/08/2024
Ms. Syed Suhana	College Alumni	
Mr.Akasapu Raviteja	Expert for Special Courses	03/08/24

Chairperson , BoS

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN

(Autonomous)

(Approved by AICTE, New Delhi and Permanently Affiliated to Andhra University, Visakhapatnam)

Madhurawada :: Visakhapatnam – 530 048

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Minutes of 1st meeting of the Board of Studies in Computer Science and Engineering department on 3rd August 2024(Saturday) at 1 PM in hybrid mode

The meeting of the Board of Studies in Computer Science and Engineering department of Gayatri Vidya Parishad College of Engineering for Women (Autonomous) is held on 3rd August 2024(Saturday) from 1 PM onwards to finalize the syllabi of the first year (1st semester and 2nd semester) courses of all B.Tech Programs and first year (1st semester and 2nd semester) courses of M.Tech CSE (Data Science) Program offered by the Department of Computer Science and Engineering under the regulations R – 2024 from the academic year 2024-25 onwards.

Members Present:

Dr P.V.S. Lakshmi Jagadamba - Chairperson

External Members:

1	Prof. Siba Kumar Udgata Professor School of Computer and Information Sciences University of Hyderabad Hyderabad	Subject Expert	Offline
2	Dr.Jyothi Vedurada Assistant Professor IIT-Hyderabad	Subject Expert	Online
3	Dr.R Padmavathy Professor, Dept of CSE NIT – Warangal	Subject Expert	Online
3	Prof.B Pragnya Dept. of Computer Science & Systems Engineering AU College of Engineering (A) Visakhapatnam	Vice Chancellor's Nominee	Offline
4	Dr.P.Gayatri Senior Technical Director / Scientist-F National Informatics Centre (NIC) Govt. of India	Industry Representative	Online
5	Ms. Sandeep Kaur Senior Software Developer Infinite Computer Solutions Visakhapatnam	College Alumni	Offline

6	Mr.Narra Suresh Delivery Centre Head Infosys Visakhapatnam	Expert for Special Courses	Offline

Internal Members:

1	Prof P. S. Avadhani	Senior Professor	Offline
2	Dr. N.B. Venkateswarlu	Professor	Offline
3	Dr. N. Sharmili	Associate Professor	Offline
4	Mrs. K. Suneetha	Assistant Professor	Offline
5	Mr. S. Sumahasan	Assistant Professor	Offline
6	Dr. A. Uday Kumar	Assistant Professor	Offline
7	Mrs. K. Rohini	Assistant Professor	Offline
8	Dr. V. Lakshmana Rao	Assistant Professor	Offline
9	Mr. G. Sankara Rao	Assistant Professor	Offline
10	Ms. Y. Sowmya	Assistant Professor	Offline
11	Ms. D. Indu	Assistant Professor	Offline
12	Mrs. V. Gowtami Annapurna	Assistant Professor	Offline
13	Mrs. KVS Mounica	Assistant Professor	Offline
14	Mrs. M Aswini	Assistant Professor	Offline
15	Ms A Bindu	Assistant Professor	Offline
16	Ms. R Archna	Assistant Professor	Offline
17	Ms. BVNS Lasya Priya	Assistant Professor	Offline

The meeting started with a welcome note by the Principal & Chairman, Academic Council wherein the salient features of the regulations R-2024 was highlighted to joint Board of Studies. Next, the Principal requested the different Department Board Chairmen/Chairpersons to discuss and approve the proposed syllabi of the first year courses under R – 2024 regulations offered for various B.Tech Programs and M.Tech Programs from the academic year 2024-25.

The Board of Studies meeting of the Department of Computer Science and Engineering started with a welcome note by the Chairperson wherein she presented a outline of the regulations R-2024 and requested the Board to discuss and approve the proposed syllabi.

After serious and fruitful deliberations on the proposed syllabi of the courses under R – 2024 regulations offered by the Department of Computer Science and Engineering for B.Tech Programs and M.Tech Programs from the academic year 2024-25 onwards, the Board agreed to offer courses for different B.Tech, M.Tech programs as requested by the Chairperson of the respective BoS of other Engineering Departments. The Board unanimously resolved the following:

Resolution No: GVPCEW(A)/BOS/CSE/2024/1

It is resolved to recommend to the Academic Council that the following courses offered for B.Tech Programs and M.Tech Programs to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Python Programming" offered to the CSE branch in the I year II Semester – Annexure-I

2. The proposed syllabus for the course titled "Fundamentals of Computers" offered to the CSE branch in the I year I Semester – Annexure-II

3. The proposed syllabus for the course titled "Python Programming Lab" offered to the CSE branch in the I year II Semester – Annexure-III

4. The proposed syllabus for the course titled "Computer Engineering Workshop " offered to the CSE branch in the I year I Semester – Annexure-IV

5. The proposed syllabus for the course titled "Problem Solving using C" offered to the CSE branch along with ECE in the I year I Semester and EEE in I year II semester– Annexure-V

6. The proposed syllabus for the course titled "Web Technologies Fundamentals Lab" offered to the CSE branch in the I year II Semester – Annexure-VI

7. The proposed syllabus for the course titled "Problem Solving using C Lab" offered to the CSE branch along with ECE in the I year I Semester and EEE in I year II semester – Annexure-VII

8. The proposed syllabus for the course titled "IT Essentials" offered to the EEE branch in the I year I Semester – Annexure-VIII

Resolution No: GVPCEW(A)/BOS/CSE/2024/2

It is resolved to recommend to the Academic Council that the following courses offered for M.Tech CSE (Data Science) Programs to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Introduction to Data Science" offered to the CSE branch in the I year I Semester – Annexure-IX

2. The proposed syllabus for the course titled "Cloud Computing and Virtualization" offered to the CSE branch in the I year I Semester – Annexure-X

3. The proposed syllabus for the course titled "Elective-I- Big Data Analytics" offered to the CSE branch in the I year I Semester – Annexure-XI

4. The proposed syllabus for the course titled "Elective-I- Computational Linear Algebra" offered to the CSE branch in the I year I Semester – Annexure-XII

5. The proposed syllabus for the course titled "Elective-I-Soft Computing" offered to the CSE branch in the I year I Semester – Annexure-XIII

6. The proposed syllabus for the course titled "Elective-I-Computational Biology" offered to the CSE branch in the I year I Semester – Annexure-XIV

7. The proposed syllabus for the course titled "Elective-I-Internet of Things" offered to the CSE branch in the I year I Semester – Annexure-XV

8. The proposed syllabus for the course titled "Elective-II- Cyber Security for Data Science" offered to the CSE branch in the I year I Semester – Annexure-XVI

9. The proposed syllabus for the course titled "Elective-II- Optimization Techniques for Data Science" offered to the CSE branch in the I year I Semester – Annexure-XVII

10. The proposed syllabus for the course titled "Elective-II- Time Series data Analysis" offered to the CSE branch in the I year I Semester – Annexure-XVIII

11. The proposed syllabus for the course titled "Elective-II- Natural Language Processing" offered to the CSE branch in the I year I Semester – Annexure-XIX

12. The proposed syllabus for the course titled "Elective-II- Statistical Modeling" offered to the CSE branch in the I year I Semester – Annexure-XX

13. The proposed syllabus for the course titled "Data Science Applications with Python Lab" offered to the CSE branch in the I year I Semester – Annexure-XXI

14. The proposed syllabus for the course titled "Cloud Computing and Big Data Analytics Lab" offered to the CSE branch in the I year I Semester – Annexure-XXII

15. The proposed syllabus for the course titled "Machine Learning" offered to the CSE branch in the I year II Semester – Annexure-XXIII

16. The proposed syllabus for the course titled "Data Visualization" offered to the CSE branch in the I year II Semester – Annexure-XXIV

17. The proposed syllabus for the course titled "Elective-III- Image and Video Analytics" offered to the CSE branch in the I year II Semester – Annexure-XXV

18. The proposed syllabus for the course titled "Elective-III- Social Media Analytics" offered to the CSE branch in the I year II Semester – Annexure-XXVI

19. The proposed syllabus for the course titled "Elective-III- Deep Learning" offered to the CSE branch in the I year II Semester – Annexure-XXVII

20. The proposed syllabus for the course titled "Elective-III- Business Analytics" offered to the CSE branch in the I year II Semester – Annexure-XXVIII

21. The proposed syllabus for the course titled "Elective-III- High Performance Computing" offered to the CSE branch in the I year II Semester – Annexure-XXIX

22. The proposed syllabus for the course titled "Elective-IV- Geographic Information System" offered to the CSE branch in the I year II Semester – Annexure-XXX

23. The proposed syllabus for the course titled "Elective-IV- Block Chain Technology" offered to the CSE branch in the I year II Semester – Annexure-XXXI

24. The proposed syllabus for the course titled "Elective-IV- Secure Software Design" offered to the CSE branch in the I year II Semester – Annexure-XXXII

25. The proposed syllabus for the course titled "Elective-IV- Data Storage Technologies and Networks" offered to the CSE branch in the I year II Semester – Annexure-XXXIII

26. The proposed syllabus for the course titled "Elective-IV- Information Retrieval Systems" offered to the CSE branch in the I year II Semester – Annexure-XXXIV

27. The proposed syllabus for the course titled "Machine Learning Lab" offered to the CSE branch in the I year II Semester – Annexure-XXXV

28. The proposed syllabus for the course titled "Data Visualization using Tableau Lab" offered to the CSE branch in the I year II Semester – Annexure-XXXVI

Resolution No: GVPCEW(A)/BOS/CSE/2024/3

The Board Members unanimously authorize the Chairman to make minor modifications in the title/content of a course if necessary.

The meeting concluded by thanking all the members.

Members Present:

Name of the Member	Designation	Signature
Dr.P.V.S.L.Jagadamba	Chairperson, BoS and Head, Dept of CSE	
Prof P. S. Avadhani	Senior Professor	
Dr. N.B. Venkateswarlu	Professor	
Dr. N. Sharmili	Associate Professor	
Mrs. K. Suneetha	Assistant Professor	
Mr. S. Sumahasan	Assistant Professor	
Dr. A. Uday Kumar	Assistant Professor	
Mrs. K. Rohini	Assistant Professor	
Dr. V. Lakshmana Rao	Assistant Professor	
Mr. G. Sankara Rao	Assistant Professor	
Ms. Y. Sowmya	Assistant Professor	
Ms. D. Indu	Assistant Professor	
Mrs. V. Gowtami Annapurna	Assistant Professor	
Mrs. KVS Mounica	Assistant Professor	
Mrs. M Aswini	Assistant Professor	
Ms A Bindu	Assistant Professor	
Ms. R Archna	Assistant Professor	
Ms. BVNS Lasya Priya	Assistant Professor	
Prof. Siba Kumar Udgata	Subject Expert	
Dr.Jyothi Vedurada	Subject Expert	
Dr.R Padmavathy	Subject Expert	
Prof.B Pragnya	Vice Chancellor's Nominee	
Dr.P.Gayatri	Industry Representative	
Ms. Sandeep Kaur	College Alumni	
Mr.Narra Suresh	Expert for Special Courses	

Chairperson, BoS

The meeting concluded by thanking all the members.

Members Present:

Name of the Member	Designation	Signature
Dr.P.V.S.L.Jagadamba	Chairperson, BoS and Head, Dept of CSE	
Prof P. S. Avadhani	Senior Professor	
Dr. N.B. Venkateswarlu	Professor	
Dr. N. Sharmili	Associate Professor	
Mrs. K. Suneetha	Assistant Professor	
Mr. S. Sumahasan	Assistant Professor	
Dr. A. Uday Kumar	Assistant Professor	
Mrs. K. Rohini	Assistant Professor	
Dr. V. Lakshmana Rao	Assistant Professor	
Mr. G. Sankara Rao	Assistant Professor	
Ms. Y. Sowmya	Assistant Professor	
Ms. D. Indu	Assistant Professor	
Mrs. V. Gowtami Annapurna	Assistant Professor	
Mrs. KVS Mounica	Assistant Professor	
Mrs. M Aswini	Assistant Professor	
Ms A Bindu	Assistant Professor	
Ms. R Archna	Assistant Professor	
Ms. BVNS Lasya Priya	Assistant Professor	
Prof. Siba Kumar Udgata	Subject Expert	
Dr.Jyothi Vedurada	Subject Expert	V. Jyoti
Dr.R Padmavathy	Subject Expert	
Prof.B Pragnya	Vice Chancellor's Nominee	
Dr.P.Gayatri	Industry Representative	
Ms. Sandeep Kaur	College Alumni	
Mr.Narra Suresh	Expert for Special Courses	

Chairperson , BoS

The meeting concluded by thanking all the members.

Members Present:

Name of the Member	Designation	Signature
Dr.P.V.S.L.Jagadamba	Chairperson, BoS and	
Prof P. S. Avadhani	Senior Professor	
Dr. N.B. Venkateswarlu	Professor	
Dr. N. Sharmili	Associate Professor	
Mrs. K. Suneetha	Assistant Professor	
Mr. S. Sumahasan	Assistant Professor	
Dr. A. Uday Kumar	Assistant Professor	
Mrs. K. Rohini	Assistant Professor	
Dr. V. Lakshmana Rao	Assistant Professor	
Mr. G. Sankara Rao	Assistant Professor	
Ms. Y. Sowmya	Assistant Professor	
Ms. D. Indu	Assistant Professor	
Mrs. V. Gowtami Annapurna	Assistant Professor	
Mrs. KVS Mounica	Assistant Professor	
Mrs. M Aswini	Assistant Professor	
Ms A Bindu	Assistant Professor	
Ms. R Archna	Assistant Professor	
Ms. BVNS Lasya Priya	Assistant Professor	
Prof. Siba Kumar Udgata	Subject Expert	
Dr.Jyothi Vedurada	Subject Expert	
Dr.R Padmavathy	Subject Expert	
Prof.B Pragnya	Vice Chancellor's Nominee	
Dr.P.Gayatri	Industry Representative	
Ms. Sandeep Kaur	College Alumni	
Mr.Narra Suresh	Expert for Special Courses	

Chairperson , BoS

The meeting concluded by thanking all the members.

Members Present:

Name of the Member	Designation	Signature
Dr.P.V.S.L.Jagadamba	Chairperson, BoS and Head, Dept of CSE	
Prof P. S. Avadhani	Senior Professor	
Dr. N.B. Venkateswarlu	Professor	
Dr. N. Sharmili	Associate Professor	
Mrs. K. Suneetha	Assistant Professor	
Mr. S. Sumahasan	Assistant Professor	
Dr. A. Uday Kumar	Assistant Professor	
Mrs. K. Rohini	Assistant Professor	
Dr. V. Lakshmana Rao	Assistant Professor	
Mr. G. Sankara Rao	Assistant Professor	
Ms. Y. Sowmya	Assistant Professor	
Ms. D. Indu	Assistant Professor	
Mrs. V. Gowtami Annapurna	Assistant Professor	
Mrs. KVS Mounica	Assistant Professor	
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Ms. BVNS Lasya Priya	Assistant Professor	
Prof. Siba Kumar Udgata	Subject Expert	
Dr.Jyothi Vedurada	Subject Expert	
Dr.R Padmavathy	Subject Expert	
Prof.B Pragnya	Vice Chancellor's Nominee	
Dr.P.Gayatri	Industry Representative	
Ms. Sandeep Kaur	College Alumni	
Mr.Narra Suresh	Expert for Special Courses	

Chairperson , BoS

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Minutes of 2nd meeting of the Board of Studies in Computer Science and Engineering department held on 28th and 29th March 2025 (Friday & Saturday) from 10:00 AM to 04:00 PM in hybrid mode.

The meeting of the Board of Studies in Computer Science and Engineering Department of Gayatri Vidya Parishad College of Engineering for Women (Autonomous) is held on 28th and 29th March 2025 (Friday & Saturday) from 10:00 AM to 04:00 PM to finalize the syllabi of the of the 2nd, 3rd & 4th year (1st semester and 2nd semester) courses of all B.Tech Programs and 2nd year (1st semester and 2nd semester) courses of M.Tech CSE (Data Science) programs offered by the Department of Computer Science and Engineering under the regulations R – 2024 from the academic year 2024-25 onwards.

Members Present:
Dr P.V.S. Lakshmi Jagadamba - Chairperson

External Members:

1	Prof. Siba Kumar Udgata Professor School of Computer and Information Sciences University of Hyderabad Hyderabad	Subject Expert	Online
2	Dr. Jyothi Vedurada Assistant Professor IIT-Hyderabad	Subject Expert	Online
3	Prof. R Padmavathy Professor, Dept of CSE NIT – Warangal	Subject Expert	Online
3	Prof. B Prajna Dept. of Computer Science & Systems Engineering AU College of Engineering (A) Visakhapatnam	Vice Chancellor's Nominee	Offline
4	Dr.P.Gayatri Senior Technical Director / Scientist-F National Informatics Centre (NIC) Govt. of India	Industry Representative	Online
5	Ms. Sandeep Kaur Senior Software Developer Infinite Computer Solutions Visakhapatnam	College Alumni	Offline
6	Mr.Narra Suresh Delivery Centre Head Infosys Visakhapatnam	Expert for Special Courses	Offline

Head of Department
Dept. of Computer Science & Engineering
GVP College of Engineering for Women
Madhurawada, Visakhapatnam-48

Internal Members:

1	Prof P. S. Avadhani	Senior Professor	Offline
2	Dr. N. Sharmili	Professor	Offline
3	Dr. V. Lakshmana Rao	Associate Professor	Offline
4	Mrs. K. Suneetha	Assistant Professor	Offline
5	Dr. S. Sumahasan	Assistant Professor	Offline
6	Dr. K. Rohini	Assistant Professor	Offline
7	Dr. G. Sankara Rao	Assistant Professor	Offline
8	Ms. Y. Sowmya	Assistant Professor	Offline
9	Ms. D. Indu	Assistant Professor	Offline
10	Mrs. V. Gowtami Annapurna	Assistant Professor	Offline
11	Mrs. KVS Mounica	Assistant Professor	Offline
12	Mrs. M Aswini	Assistant Professor	Offline
13	Ms. R Archna	Assistant Professor	Offline
14	Ms. B.V.N.S Lasya Priya	Assistant Professor	Offline
15	Dr. P Muralidhar Rao	Assistant Professor	Offline
16	Ms. K.A.V Lakshmi Prasanna	Assistant Professor	Offline

The meeting commenced with the Principal & Chairman, Academic Council, welcoming the members of Board of Studies of different departments and requested to frame the syllabus in accordance with the guidelines of NEP-2020 and the industry standards.

Following this, the Principal informed the members about the amendment made to the Academic Rules and Regulations (R-24) for B.Tech Programs in accordance with AICTE recommendations during the Academic Council meeting held on 26.10.2024.

The amendment pertains to the B.Tech Program regulations at GVPCEW(A), effective from the 2024-25 admitted batch. As per Section 17 (A-ii) of the Academic Rules & Regulations (R-24), the previous requirement for earning a B.Tech Degree with a Minor was to complete 12 credits within the 160-credit framework of the B.Tech program. This condition has now been revised, requiring students to earn 12 additional credits beyond the 160-credit requirement.

The Board of Studies (BoS) meeting of the Department of Computer Science and Engineering commenced with a welcome note from the Chairperson, who also outlined the key resolutions made in the earlier BoS meeting held on 3rd August 2024, which finalized the course structure and syllabi of the 1st year. The Chairperson further requested the Board to deliberate on the course structure and syllabi for the 2nd, 3rd, and 4th years and approve the proposed modifications.

After a detailed and constructive discussion on the revised syllabus for the B.Tech and M.Tech programs under R-24 regulations, the Board collectively agreed to implement the proposed courses across various B.Tech and M.Tech programs.

Head of Department
Dept. of Computer Science & Engineering
GVP College of Engineering for Women
Madhurawada, Visakhapatnam-48

The Board unanimously resolved the following:

Item-1 : B.Tech CSE Course Structure

Resolution No: GVPCEW(A)/BOS-2/CSE/2025/1

It has been resolved to recommend to the Academic Council for approval of the Course Structure, as outlined in Annexure-I, be implemented for the B.Tech CSE Program, effective from the 2024 admitted batch onwards.

Item-2 : Approval of syllabus of II, III & IV B.Tech CSE Program

Resolution No: GVPCEW(A)/BOS-2/CSE/2025/2

It is resolved to recommend to the Academic Council that the following courses offered for B.Tech CSE Program to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Computer Organization" offered to the CSE branch in the II year I Semester – Annexure-II
2. The proposed syllabus for the course titled "Data Structures" offered to the CSE branch in the II year I Semester – Annexure-III
3. The proposed syllabus for the course titled "Object Oriented Programming Through Java" offered to the CSE branch in the II year I Semester – Annexure-IV
4. The proposed syllabus for the course titled "Operating Systems" offered to the CSE branch in the II year I Semester – Annexure-V
5. The proposed syllabus for the course titled "Data Structures Lab" offered to the CSE branch in the II year I Semester – Annexure-VI
6. The proposed syllabus for the course titled "Object Oriented Programming Through Java Lab" offered to the CSE branch in the II year I Semester – Annexure-VII
7. The proposed syllabus for the course titled "Operating Systems Lab" offered to the CSE branch in the II year I Semester – Annexure-VIII
8. The proposed syllabus for the course titled "Skill Course-1: Advanced Python Programming" offered to the CSE branch in the II year I Semester – Annexure-IX
9. The proposed syllabus for the course titled "Design and Analysis of Algorithms" offered to the CSE branch in the II year II Semester – Annexure-X
10. The proposed syllabus for the course titled "Database Management Systems" offered to the CSE branch in the II year II Semester – Annexure-XI
11. The proposed syllabus for the course titled "Formal Languages and Automata Theory" offered to the CSE branch in the II year II Semester – Annexure-XII
12. The proposed syllabus for the course titled "Algorithms Lab Through C++" offered to the CSE branch in the II year II Semester – Annexure-XIII

Head of Department
Dept. of Computer Science & Engineering
GVP College of Engineering for Women
Madhurawada, Visakhapatnam-48

13. The proposed syllabus for the course titled "Database Management Systems Lab" offered to the CSE branch in the II year II Semester – Annexure-XIV
14. The proposed syllabus for the course titled "Skill Course II: MERN Stack Development" offered to the CSE branch in the II year II Semester – Annexure-XV
15. The proposed syllabus for the course titled "Computer Networks" offered to the CSE branch in the III year I Semester – Annexure-XVI
16. The proposed syllabus for the course titled "Data Warehousing and Data Mining" offered to the CSE branch in the III year I Semester – Annexure-XVII
17. The proposed syllabus for the course titled "Compiler Design" offered to the CSE branch in the III year I Semester – Annexure-XVIII
18. The proposed syllabus for the course titled "Computer Networks Lab" offered to the CSE branch in the III year I Semester – Annexure-XIX
19. The proposed syllabus for the course titled "Data Mining Lab" offered to the CSE branch in the III year I Semester – Annexure-XX
20. The proposed syllabus for the course titled "Skill Course III: Continuous Integration and Continuous Delivery Using DevOps" offered to the CSE branch in the III year I Semester – Annexure-XXI
21. The proposed syllabus for the course titled "Design Thinking, Innovations & Entrepreneurship" as mandatory course offered to the CSE branch in the III year I Semester – Annexure-XXII
22. The proposed syllabus for the course titled "Machine Learning" offered to the CSE branch in the III year II Semester – Annexure-XXIII
23. The proposed syllabus for the course titled "Cryptography and Network Security" offered to the CSE branch in the III year II Semester – Annexure-XXIV
24. The proposed syllabus for the course titled "Object Oriented Software Engineering" offered to the CSE branch in the III year II Semester – Annexure-XXV
25. The proposed syllabus for the course titled "Machine Learning Lab" offered to the CSE branch in the III year II Semester – Annexure-XXVI
26. The proposed syllabus for the course titled "Cryptography and Network Security Lab" offered to the CSE branch in the III year II Semester – Annexure-XXVII
27. The proposed syllabus for the course titled "Object Oriented Software Engineering Lab" offered to the CSE branch in the III year II Semester – Annexure-XXVIII
28. The proposed syllabus for the course titled "Skill Course V: Big Data Analytics with PySpark" offered to the CSE branch in the IV year I Semester – Annexure-XXIX
29. The proposed syllabus for the course titled "Skill Course V: Deep Learning Essentials With Python" offered to the CSE branch in the IV year I Semester – Annexure-XXX

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Item-3 : Approval of syllabus of Professional Elective courses

Resolution No: GVPCEW(A)/BOS-2/CSE/2025/3

It is resolved to recommend to the Academic Council that the following Program Elective courses offered for B.Tech CSE Program to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "API and Micro Services" offered to the CSE branch as Professional Elective – Annexure-XXXI
2. The proposed syllabus for the course titled "Artificial Intelligence Techniques" offered to the CSE branch as Professional Elective – Annexure-XXXII
3. The proposed syllabus for the course titled "Block Chain Technologies" offered to the CSE branch as Professional Elective – Annexure-XXXIII
4. The proposed syllabus for the course titled "Computer Vision" offered to the CSE branch as Professional Elective – Annexure-XXXIV
5. The proposed syllabus for the course titled "Cybersecurity and Digital Forensics" offered to the CSE branch as Professional Elective – Annexure-XXXV
6. The proposed syllabus for the course titled "Deep Learning" offered to the CSE branch as Professional Elective – Annexure-XXXVI
7. The proposed syllabus for the course titled "Distributed Systems" offered to the CSE branch as Professional Elective – Annexure-XXXVII
8. The proposed syllabus for the course titled "Ethical Hacking" offered to the CSE branch as Professional Elective – Annexure-XXXVIII
9. The proposed syllabus for the course titled "Fog and Edge Computing" offered to the CSE branch as Professional Elective – Annexure-XXXIX
10. The proposed syllabus for the course titled "Generative AI Models" offered to the CSE branch as Professional Elective – Annexure-XL
11. The proposed syllabus for the course titled "Hadoop and Big Data Analytics" offered to the CSE branch as Professional Elective – Annexure-XLI
12. The proposed syllabus for the course titled "Human Computer Interaction" offered to the CSE branch as Professional Elective – Annexure-XLII
13. The proposed syllabus for the course titled "Java Spring Framework" offered to the CSE branch as Professional Elective – Annexure-XLIII
14. The proposed syllabus for the course titled "Mobile Application Development" offered to the CSE branch as Professional Elective – Annexure-XLIV
15. The proposed syllabus for the course titled "NoSQL Databases" offered to the CSE branch as Professional Elective – Annexure-XLV

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16. The proposed syllabus for the course titled "Soft Computing" offered to the CSE branch as Professional Elective – Annexure-XLVI

Item-4 : Approval of syllabus of Open Elective courses & Other department courses offered by CSE

Resolution No: GVPCEW(A)/BOS-2/CSE/2025/4

It is resolved to recommend to the Academic Council that the following Open Elective courses and other department courses offered by CSE Program to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Introduction to Artificial Intelligence" offered by CSE branch as Open Elective to other branches – Annexure-XLVII
2. The proposed syllabus for the course titled "Human Machine Interaction" offered by CSE branch as Open Elective to other branches – Annexure-XLVIII
3. The proposed syllabus for the course titled "Software Project Management" offered by CSE branch as Open Elective to other branches – Annexure-XLIX
4. The proposed syllabus for the course titled "Skill Course: Data Structures using Python" offered to the EEE branch in III year II Semester as skill course Annexure-L

Item-5 : Approval of the subjects & syllabus related to Minor program in CSE

Resolution No: GVPCEW(A)/BOS-2/CSE/2025/5

It is resolved to recommend to the Academic Council that the following courses offered for Minor Program in CSE to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Introduction to Web Technologies" offered to the CSE branch as Minor Course – Annexure-LI
2. The proposed syllabus for the course titled "Introduction to Database Management System" offered to the CSE branch as Minor Course – Annexure-LII.
3. The proposed syllabus for the course titled "Principles Of Operating Systems" offered to the CSE branch as Minor Course – Annexure-LIII.
4. The proposed syllabus for the course titled "Software Engineering" offered to the CSE branch as Minor Course – Annexure-LIV

Item-6 : Approval of the subjects & syllabus related to Honors program in CSE

Resolution No: GVPCEW(A)/BOS-2/CSE/2025/6

It is resolved to recommend to the Academic Council that the following courses offered for Honors Program in CSE to be effective from 2024 admitted batch onwards for approval.

Head of Department
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GVP College of Engineering for Wome
Madhurawada, Visakhapatnam-48

1. The proposed syllabus for the course titled "High Performance Computing" offered to the CSE branch as Honors Course – Annexure-LV
2. The proposed syllabus for the course titled "Fundamentals of Reinforcement Learning" offered to the CSE branch as Honors Course – Annexure-LVI
3. The proposed syllabus for the course titled "Quantum Computing" offered to the CSE branch as Honors Course – Annexure-LVII
4. The proposed syllabus for the course titled "Social Media Analytics" offered to the CSE branch as Honors Course – Annexure-LVIII
5. The proposed syllabus for the course titled "Software Metrics" offered to the CSE branch as Honors Course – Annexure-LIX

Item-7: Approval of Course Structure & syllabus of II M.Tech

Resolution No: GVPCEW(A)/BOS/CSE/2025/7

It is resolved to recommend to the Academic Council that the following courses offered for II year M.Tech CSE (Data Science) Programs to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Elective-V-Digital Forensics" offered to the CSE branch in the II year I Semester – Annexure-LX
2. The proposed syllabus for the course titled "Elective-V-Enterprise Cloud Computing" offered to the CSE branch in the II year I Semester – Annexure-LXI
3. The proposed syllabus for the course titled "Elective-V-Parallel Computing" offered to the CSE branch in the II year I Semester – Annexure-LXII
4. The proposed syllabus for the course titled "Elective-V-Data Science in Finance" offered to the CSE branch in the II year I Semester – Annexure-LXIII
5. The proposed syllabus for the course titled "Elective-V-Data Science for Health Care" offered to the CSE branch in the II year I Semester – Annexure-LXIV

Resolution No: GVPCEW(A)/BOS/CSE/2025/8

The Board Members unanimously authorize the Chairman to make minor modifications in the title/content of a course if necessary.

The meeting is concluded by thanking all the BoS members present in online or offline mode.

Head of Department
Dept. of Computer Science & Engineering
GVP College of Engineering for Women
Madhurawada, Visakhapatnam-48

Members Present:

Name of the Member	Designation	Signature
Dr.P.V.S.L.Jagadamba	Chairperson, BoS and Head, Dept of CSE	
Prof P. S. Avadhani	Senior Professor	
Dr. N. Sharmili	Professor	
Dr. V. Lakshmana Rao	Associate Professor	
Mrs. K. Suneetha	Assistant Professor	
Dr. S. Sumahasan	Assistant Professor	
Dr. K. Rohini	Assistant Professor	
Dr. G. Sankara Rao	Assistant Professor	
Ms. Y. Sowmya	Assistant Professor	
Ms. D. Indu	Assistant Professor	
Mrs. V. Gowtami Annapurna	Assistant Professor	
Mrs. KVS Mounica	Assistant Professor	
Mrs. M Aswini	Assistant Professor	
Ms. R Archna	Assistant Professor	
Ms. BVNS Lasya Priya	Assistant Professor	
Dr. P Muralidhar	Assistant Professor	
Ms. K.A.V Lakshmi Prasanna	Assistant Professor	
Prof. Siba Kumar Udgata	Subject Expert	
Dr. Jyothi Vedurada	Subject Expert	
Dr. R Padmavathy	Subject Expert	
Prof. B Prajnya	Vice Chancellor's Nominee	
Dr. P.Gayatri	Industry Representative	
Ms. Sandeep Kaur	College Alumni	
Mr. Narra Suresh	Expert for Special Courses	

Chairperson, BoS

Head of Department
Dept. of Computer Science & Engineering
GVP College of Engineering for Women
Madhurawada, Visakhapatnam-48

Members Present:

Name of the Member	Designation	Signature
Dr P.V.S.L.Jagadamba	Chairperson, BoS and Head, Dept of CSE	
Prof P. S. Avadhani	Senior Professor	
Dr. N. Sharmili	Professor	
Dr. V. Lakshmana Rao	Associate Professor	
Mrs. K. Suneetha	Assistant Professor	
Dr. S. Sumathasan	Assistant Professor	
Dr. K. Rohini	Assistant Professor	
Dr. G. Sankara Rao	Assistant Professor	
Ms. Y. Sowmya	Assistant Professor	
Ms. D. Indu	Assistant Professor	
Mrs. V. Gowtami Annapurna	Assistant Professor	
Mrs. KVS Mounica	Assistant Professor	
Mrs. M Aswini	Assistant Professor	
Ms. R Archna	Assistant Professor	
Ms. BVNS Lasya Priya	Assistant Professor	
Dr. P Muralidhar	Assistant Professor	
Ms. K.A.V Lakshmi Prasanna	Assistant Professor	
Prof. Siba Kumar Udgata	Subject Expert	
Dr. Jyothi Vedurada	Subject Expert	
Dr. R Padmavathy	Subject Expert	
Prof. B Prajnya	Vice Chancellor's Nominee	
Dr. P.Gayatri	Industry Representative	
Ms. Sandeep Kaur	College Alumni	
Mr. Narra Suresh	Expert for Special Courses	

Chairperson , BoS

Members Present:

Name of the Member	Designation	Signature
Dr.P.V.S.L.Jagadamba	Chairperson, BoS and Head, Dept of CSE	
Prof P. S. Avadhani	Senior Professor	
Dr. N. Sharmili	Professor	
Dr. V. Lakshmana Rao	Associate Professor	
Mrs. K. Suneetha	Assistant Professor	
Dr. S. Sumahasan	Assistant Professor	
Dr. K. Rohini	Assistant Professor	
Dr. G. Sankara Rao	Assistant Professor	
Ms. Y. Sowmya	Assistant Professor	
Ms. D. Indu	Assistant Professor	
Mrs. V. Gowtami Annapurna	Assistant Professor	
Mrs. KVS Mounica	Assistant Professor	
Mrs. M Aswini	Assistant Professor	
Ms. R Archna	Assistant Professor	
Ms. BVNS Lasya Priya	Assistant Professor	
Dr. P Muralidhar	Assistant Professor	
Ms. K.A.V Lakshmi Prasanna	Assistant Professor	
Prof. Siba Kumar Udgata	Subject Expert	
Dr. Jyothi Vedurada	Subject Expert	V. Jyothi
Dr. R Padmavathy	Subject Expert	
Prof. B Prajnya	Vice Chancellor's Nominee	
Dr. P.Gayatri	Industry Representative	
Ms. Sandeep Kaur	College Alumni	
Mr. Narra Suresh	Expert for Special Courses	

Chairperson , BoS

Members Present:

Name of the Member	Designation	Signature
Dr.P.V.S.L.Jagadamba	Chairperson, BoS and Head, Dept of CSE	
Prof P. S. Avadhani	Senior Professor	
Dr. N. Sharmili	Professor	
Dr. V. Lakshmana Rao	Associate Professor	
Mrs. K. Suncetha	Assistant Professor	
Dr. S. Sumahasan	Assistant Professor	
Dr. K. Rohini	Assistant Professor	
Dr. G. Sankara Rao	Assistant Professor	
Ms. Y. Sowmya	Assistant Professor	
Ms. D. Indu	Assistant Professor	
Mrs. V. Gowtami Annapurna	Assistant Professor	
Mrs. KVS Mounica	Assistant Professor	
Mrs. M Aswini	Assistant Professor	
Ms. R Archna	Assistant Professor	
Ms. BVNS Lasya Priya	Assistant Professor	
Dr. P Muralidhar	Assistant Professor	
Ms. K.A.V Lakshmi Prasanna	Assistant Professor	
Prof. Siba Kumar Udgata	Subject Expert	
Dr. Jyothi Vedurada	Subject Expert	
Prof. R Padmavathy	Subject Expert	
Prof. B Prajnya	Vice Chancellor's Nominee	
Dr. P.Gayatri	Industry Representative	
Ms. Sandeep Kaur	College Alumni	
Mrs. KVS Mounica	Assistant Professor	
Mr. Narra Suresh	Expert for Special Courses	

Chairperson , BoS

Members Present:

Name of the Member	Designation	Signature
Dr.P.V.S.L.Jagadamba	Chairperson, BoS and Head, Dept of CSE	
Prof P. S. Avadhani	Senior Professor	
Dr. N. Sharmili	Professor	
Dr. V. Lakshmana Rao	Associate Professor	
Mrs. K. Suneetha	Assistant Professor	
Dr. S. Sumahasan	Assistant Professor	
Dr. K. Rohini	Assistant Professor	
Dr. G. Sankara Rao	Assistant Professor	
Ms. Y. Sowmya	Assistant Professor	
Ms. D. Indu	Assistant Professor	
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Ms. BVNS Lasya Priya	Assistant Professor	
Dr. P Muralidhar	Assistant Professor	
Ms. K.A.V Lakshmi Prasanna	Assistant Professor	
Prof. Siba Kumar Udgata	Subject Expert	
Dr. Jyothi Vedurada	Subject Expert	
Dr. R Padmavathy	Subject Expert	
Prof. B Prajnya	Vice Chancellor's Nominee	
Dr. P.Gayatri	Industry Representative	Gayatri 2/4/25.
Ms. Sandeep Kaur	College Alumni	
Mr. Narra Suresh	Expert for Special Courses	

Chairperson , BoS

Members Present:

Name of the Member	Designation	Signature
Dr.P.V.S.L.Jagadamba	Chairperson, BoS and Head, Dept of CSE	
Prof P. S. Avadhani	Senior Professor	
Dr. N. Sharmili	Professor	
Dr. V. Lakshmana Rao	Associate Professor	
Mrs. K. Suneetha	Assistant Professor	
Dr. S. Sumahasan	Assistant Professor	
Dr. K. Rohini	Assistant Professor	
Dr. G. Sankara Rao	Assistant Professor	
Ms. Y. Sowmya	Assistant Professor	
Ms. D. Indu	Assistant Professor	
Mrs. V. Gowtami Annapurna	Assistant Professor	
Mrs. KVS Mounica	Assistant Professor	
Mrs. M Aswini	Assistant Professor	
Ms. R Archna	Assistant Professor	
Ms. BVNS Lasya Priya	Assistant Professor	
Dr. P Muralidhar	Assistant Professor	
Ms. K.A.V Lakshmi Prasanna	Assistant Professor	
Prof. Siba Kumar Udgata	Subject Expert	
Dr. Jyothi Vedurada	Subject Expert	
Prof. R Padmavathy	Subject Expert	
Prof. B Prajnya	Vice Chancellor's Nominee	
Dr. P.Gayatri	Industry Representative	
Ms. Sandeep Kaur	College Alumni	Sandeep Kaur
Mr. Narra Suresh	Expert for Special Courses	

Chairperson , BoS

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Minutes of 1st meeting of the Board of Studies in Electronics and Communication Engineering department on 3rd August 2024(Saturday) at 1 PM in hybrid mode

The meeting of the Board of Studies in Electronics and Communication Engineering department of Gayatri Vidya Parishad College of Engineering for Women (Autonomous) is held on 3rd August 2024(Saturday) from 1 PM onwards to finalize the syllabi of the first year (1st semester and 2nd semester) courses of all B.Tech Programs and first year((1st semester and 2nd semester) courses of M.Tech programs offered by the Department of Electronics and Communication Engineering under the regulations R – 2024 from the academic year 2024-25 onwards.

Members Present:

Dr P.M.K.Prasad - Chairperson

External Members:

1	Prof. Tapan Kumar Gandhi Professor, Department of Electrical Engineering Indian Institute of Technology, Delhi	Subject Expert	Online
2	Prof.Venkata Mani V. Professor Dept.of ECE, National Institute of Technology, Warangal	Subject Expert	Offline
3	Prof.P.Rajesh Kumar Professor Dept.of Electronics and Communication Engineering AU College of Engineering (A) Visakhapatnam	Vice Chancellor's Nominee	Offline
4	Sri A.Venkata Krishna CEO , Ascentsemi R & D Pvt.Ltd Bengaluru	Industry Representative	Offline
5	Ms.Krishna Deepika Chittela Staff Engineer Synoposys, Bengaluru	College Alumni	Online
6	Sri Amal Raj Pukkella Founder, Digifac Services Pvt.Ltd & COO, Headfitted Pvt Ltd Visakhapatnam	Expert for Special Courses	Offline

Internal Members:

1	Dr.L.Ganesh	Associate Professor	Offline
2	Dr.B.Vijayalakshmi	Associate Professor	Offline

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DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING

3	Dr.D.V.A.N.Ravikumar	Associate Professor	Offline
4	Ms.B.V.S.Renuka Devi	Assistant Professor	On leave
5	Ms.Ch.Sirisha	Assistant Professor	Offline
6	Dr.M.Manikumari	Assistant Professor	Offline
7	Mr.N.V.Maheswara Rao	Assistant Professor	Offline
8	Ms.B.Lakshmi	Assistant Professor	Offline
9	Ms.L.Sarika	Assistant Professor	Offline
10	Mr.R.Sunil Kumar	Assistant Professor	Offline
11	Mr.PVK Chaitanya	Assistant Professor	Offline
12	Ms.N.Roopavathi	Assistant Professor	Offline
13	Ms.B.Divyasathi	Assistant Professor	Offline
14	Dr.P.V.Dileep Bhumireddi	Assistant Professor	Offline
15	Ms.R.Jalaja	Assistant Professor	Maternity leave
16	Ms.M.Hemlata	Assistant Professor	On Leave
17	Ms.BVR Gowri	Assistant Professor	Offline
18	Ms.K.Aishawrya	Assistant Professor	On leave

The meeting started with a welcome note by the Principal & Chairman, Academic Council wherein the salient features of the regulations R-2024 was highlighted to joint Board of Studies. Next, the Principal requested the different Department Board Chairmen/Chairpersons to discuss and approve the proposed syllabi of the first year courses under R – 2024 regulations offered for various B.Tech Programs and M.Tech Programs from the academic year 2024-25.

The Board of Studies meeting of the Department of Electronics and Communication Engineering started with a welcome note by the Chairperson wherein she presented a outline of the regulations R-2024 and requested the Board to discuss and approve the proposed syllabi.

After serious and fruitful deliberations on the proposed syllabi of the courses under R – 2024 regulations offered by the Department of Electronics and Communication Engineering for B.Tech and M.Tech Programs from the academic year 2024-25 onwards, the Board agreed to offer courses for different B.Tech,M.Tech programs as requested by the Chairperson of the respective BoS of other Engineering Departments. The Board unanimously resolved the following:

Resolution No: GVPCEW(A)/BOS/ECE/2024/1

It is resolved to recommend to the Academic Council that the following courses offered for B.Tech Programs to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Electronic Devices and Circuits " offered to the ECE branch in the I year I Semester – Annexure-I

2. The proposed syllabus for the course titled "Electronic Devices and Circuits Lab " offered to the ECE branch in the I year I Semester – Annexure-II

3. The proposed syllabus for the course titled "Basic Electronics Engineering " offered to the EEE branch in the I year I semester – Annexure-III

4. The proposed syllabus for the course titled "Elements of Electronics Engineering " offered to the CSM,CSE,IT branch in the I year I semester/II Semester-Annexure-IV

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ELECTRONICS AND COMMUNICATION ENGINEERING
G.V.P.COLLEGE OF ENGINEERING FOR WOMEN

5. The proposed syllabus for the course titled "Digital Logic Design " offered to the ECE branch in the I year II Semester – Annexure-V

6. The proposed syllabus for the course titled "Electronic Circuit Analysis " offered to the ECE branch in the I year II Semester – Annexure-VI

7. The proposed syllabus for the course titled "Digital Logic Design lab " offered to the ECE branch in the I year II Semester – Annexure-VII

8. The proposed syllabus for the course titled "Electronic Circuit Analysis lab " offered to the ECE branch in the I year II Semester – Annexure-VIII

Resolution No: GVPCEW(A)/BOS/ECE/2024/2

It is resolved to recommend to the Academic Council that the following courses offered for M.Tech Programs to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Analog and Digital CMOS VLSI Design" offered to the ECE branch in the I year I Semester – Annexure-IX

2. The proposed syllabus for the course titled "Embedded systems Design " offered to the ECE branch in the I year I Semester – Annexure-X

3. The proposed syllabus for the course titled "Application Specific Integrated Circuit(ASIC) " offered to the ECE branch in the I year I Semester – Annexure-XI

4. The proposed syllabus for the course titled "Advanced Operating Systems" offered to the ECE branch in the I year I Semester – Annexure-XII

5. The proposed syllabus for the course titled "Parallel Processing" offered to the ECE branch in the I year I Semester – Annexure-XIII

6. The proposed syllabus for the course titled "CPLD and FPGA Architectures & Applications" offered to the ECE branch in the I year I Semester – Annexure-XIV

7. The proposed syllabus for the course titled "Electronic Design Automation Tools " offered to the ECE branch in the I year I Semester – Annexure-XV

8. The proposed syllabus for the course titled "Digital System Design " offered to the ECE branch in the I year I Semester – Annexure-XVI

9. The proposed syllabus for the course titled "Analog and Digital CMOS VLSI Design Lab " offered to the ECE branch in the I year I Semester – Annexure-XVII

10. The proposed syllabus for the course titled "Embedded systems Design Lab " offered to the ECE branch in the I year I Semester – Annexure-XVIII

11. The proposed syllabus for the course titled "RTL Design & Verification using System Verilog" offered to the ECE branch in the I year II Semester – Annexure-XIX

12. The proposed syllabus for the course titled "Internet of Things and its applications " offered to the ECE branch in the I year II Semester – Annexure-XX

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ELECTRONICS AND COMMUNICATION ENGINEERING
G V P COLLEGE OF ENGINEERING FOR WOMEN

13. The proposed syllabus for the course titled "Low power VLSI Design " offered to the ECE branch in the I year II Semester – Annexure-XXI

14. The proposed syllabus for the course titled "System on Chip Design " offered to the ECE branch in the I year II Semester – Annexure-XXII

15. The proposed syllabus for the course titled "Digital signal and Image Processing " offered to the ECE branch in the I year II Semester – Annexure-XXIII

16. The proposed syllabus for the course titled "Communication Buses and Interfaces "offered to the ECE branch in the I year II Semester – Annexure-XXIV

17. The proposed syllabus for the course titled "Design for Testability "offered to the ECE branch in the I year II Semester – Annexure-XXV.

18. The proposed syllabus for the course titled "DSP Processors and Architectures "offered to the ECE branch in the I year II Semester – Annexure-XXVI

19.The proposed syllabus for the course titled "RTL Design & Verification using System Verilog lab " offered to the ECE branch in the I year II Semester – Annexure-XXVII.

20. The proposed syllabus for the course titled "Internet of Things and its applications lab offered to the ECE branch in the I year II Semester – Annexure-XXVIII

21. The proposed syllabus for the course titled "Mini project with seminar " offered to the ECE branch in the I year II Semester – Annexure-XXIX

Resolution No: GVPCEW(A)/BOS/ECE/2024/3

The Board Members unanimously authorize the Chairperson to make minor modifications in the title/content of a course if necessary.

The meeting concluded by thanking all the members.

Members Present:

Name of the Member	Designation	Signature
Dr.P.M.K.Prasad	Chairperson, BoS and Head, Dept of ECE	
Dr.L.Ganesh	Associate Professor	
Dr.B.Vijayalakshmi	Associate Professor	
Dr.D.V.A.N.Ravikumar	Associate Professor	
Ms.Ch.Sirisha	Assistant Professor	
Dr.M.Manikumari	Assistant Professor	
Mr.N.V.Maheswara Rao	Assistant Professor	
Ms.B.Lakshmi	Assistant Professor	
Ms.L.Sarika	Assistant Professor	
Mr.R.Sunil Kumar	Assistant Professor	
Mr.PVK Chaitanya	Assistant Professor	
Ms.N.Roopavathi	Assistant Professor	
Ms.B.Divyasathi	Assistant Professor	
Dr.P.V.Dileep Bhumireddi	Assistant Professor	

HEAD
DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING

Ms.B.V.R.Gowri	Assistant Professor	
Dr. Tapan Kumar Gandhi	Subject Expert	
Prof.Venkata Mani V.	Subject Expert	
Prof.P.Rajesh Kumar	Vice Chancellor's Nominee	
Sri A.Venkata Krishna	Industry Representative	
Ms.Krishna Deepika Chittela	College Alumni	
Sri Amal Raj Pukkella	Expert for Special Courses	

Chairperson, BoS

HEAD
DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING
G V P COLLEGE OF ENGINEERING FOR W
MADHURAWADA, VISAKHAPATNAM -- 5

Ms.B.V.R.Gowri	Assistant Professor	
Prof.Tapan Kumar Gandhi	Subject Expert	
Prof.Venkata Mani V.	Subject Expert	
Prof.P.Rajesh Kumar	Vice Chancellor's Nominee	
Sri A.Venkata Krishna	Industry Representative	
Ms.Krishna Deepika Chittela	College Alumni	
Sri Amal Raj Pukkella	Expert for Special Courses	

Chairperson , BoS

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DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING
G V P COLLEGE OF ENGINEERIING FOR WO
MADHURAWADA, VISAKHAPATNAM – 5

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous)
(Approved by AICTE, New Delhi and Permanently Affiliated to Andhra University, Visakhapatnam)
Madhurawada :: Visakhapatnam – 530 048

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Minutes of the 2nd meeting of the Board of Studies in Electronics and Communication Engineering Department held on 10th & 11th April 2025(Thursday & Friday) from 10:00AM to 04:00PM in hybrid mode

The meeting of the Board of Studies in Electronics and Communication Engineering Department of Gayatri Vidya Parishad College of Engineering for Women is held on 10th & 11th April 2025 (Thursday & Friday) from 10:00AM to 04:00PM to finalize the course structure and syllabi of the 2nd , 3rd & 4th year (1st semester and 2nd semester) courses of all B.Tech Programs and 2nd year((1st semester and 2nd semester) courses of M.Tech programs offered by the Department of Electronics and Communication Engineering under the regulations R – 24 from the academic year 2024-25 onwards.

Members Present:

Dr P.M.K.Prasad - Chairperson

External Members:

1	Prof. Tapan Kumar Gandhi Professor, Department of Electrical Engineering Indian Institute of Technology, Delhi	Subject Expert	Online
2	Prof. Venkata Mani V. Professor Dept. of ECE, National Institute of Technology, Warangal	Subject Expert	Offline
3	Prof. P. Rajesh Kumar Professor Dept. of Electronics and Communication Engineering AU College of Engineering (A) Visakhapatnam	Vice Chancellor's Nominee	Offline
4	Sri A. Venkata Krishna CEO , Ascentsemi R & D Pvt.Ltd Bengaluru	Industry Representative	Offline
5	Ms.Krishna Deepika Chittela Staff Engineer Synoposys, Bengaluru	College Alumni	Offline
6	Sri Amal Raj Pukkella Founder, Digifac Services Pvt.Ltd & COO, Headfitted Pvt Ltd Visakhapatnam	Expert for Special Courses	Offline

HEAD
DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING
G V P COLLEGE OF ENGINEERING FOR WOMEN
MADHURAWADA, VISAKHAPATNAM – 530 048

Internal Members:

1	Dr.L.Ganesh	Associate Professor	Offline
2	Dr.B.Vijayalakshmi	Associate Professor	Offline
3	Dr.D.V.A.N.Ravikumar	Associate Professor	Offline
4	Ms.B.V.S.Renuka Devi	Assistant Professor	Offline
5	Ms.Ch.Sirisha	Assistant Professor	Offline
6	Dr.M.Manikumari	Assistant Professor	Offline
7	Mr.N.V.Maheswara Rao	Assistant Professor	Offline
8	Ms.B.Lakshmi	Assistant Professor	Offline
9	Ms.L.Sarika	Assistant Professor	Offline
10	Mr.R.Sunil Kumar	Assistant Professor	Offline
11	Mr.PVK Chaitanya	Assistant Professor	Offline
12	Ms.N.Roopavathi	Assistant Professor	Offline
13	Ms.B.Divyasathi	Assistant Professor	Offline
14	Dr.P.V.Dileep Bhumireddi	Assistant Professor	Offline
15	Ms.R.Jalaja	Assistant Professor	Offline
16	Ms.M.Hemlata	Assistant Professor	On Leave
17	Ms.BVR Gowri	Assistant Professor	Offline

The meeting commenced with the Principal & Chairman, Academic Council, welcoming the members of Board of Studies of different departments and requested to frame the syllabus in accordance with the guidelines of NEP-2020 and the industry standards.

Following this, the Principal informed the members about the amendment made to the Academic Rules and Regulations (R-24) for B.Tech Programs in accordance with AICTE recommendations during the Academic Council meeting held on 26.10.2024.

The amendment pertains to the B.Tech Program regulations at GVPCEW(A), effective from the 2024-25 admitted batch. As per Section 17 (A-ii) of the Academic Rules & Regulations (R-24), the previous requirement for earning a B.Tech Degree with a Minor was to complete 12 credits within the 160-credit framework of the B.Tech program. This condition has now been revised, requiring students to earn 12 additional credits beyond the 160-credit requirement.

The Board of Studies (BoS) meeting of the Department of Electronics and Communication Engineering commenced with a welcome note from the Chairperson, who also outlined the key resolutions made in the earlier BoS meeting held on 3rd August 2024, which finalized the course structure and syllabi of the 1st year. The Chairperson further requested the Board to deliberate on the course structure and syllabi for the 2nd, 3rd, and 4th years and approve the proposed modifications.

After a detailed and constructive discussion on the revised syllabus for the B.Tech and M.Tech programs under R-24 regulations, the Board collectively agreed to implement the proposed courses across various B.Tech and M.Tech programs.

The Board unanimously resolved the following:

Item-1 : B.Tech ECE Course Structure

Resolution No: GVPCEW(A)/BOS-2/ECE/2025/1

It has been resolved to recommend to the Academic Council for approval, the course structure of 2nd, 3rd & 4th year B. Tech Program as outlined in Annexure-I. The courses are to be offered for B.Tech ECE program from the 2024 admitted batch onwards.

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DEPARTMENT OF
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Item-2 : Approval of the syllabus of II, III & IV B.Tech ECE Program

Resolution No: GVPCEW(A)/BOS-2/ECE/2025/2

It is resolved to recommend to the Academic Council that the following courses offered for B.Tech ECE Program to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Linear ICs & Applications" offered to the ECE branch in the II year I Semester – Annexure-II
2. The proposed syllabus for the course titled "Pulse and Digital Circuits" offered to the ECE branch in the II year I Semester – Annexure-III
3. The proposed syllabus for the course titled "Signals & Systems" offered to the ECE branch in the II year I Semester – Annexure-IV
4. The proposed syllabus for the course titled "Linear ICs & Pulse Circuits Lab" offered to the ECE branch in the II year I Semester – Annexure-V
5. The proposed syllabus for the course titled "Signals & Systems lab" offered to the ECE branch in the II year I Semester – Annexure-VI
6. The proposed syllabus for the course titled "Python Programming" offered to the ECE branch in the II year I Semester – Annexure-VII
7. The proposed syllabus for the course titled "Probability Theory and Random Process" offered to the ECE branch in the II year II Semester – Annexure-VIII
8. The proposed syllabus for the course titled "Digital System Design" offered to the ECE branch in the II year II Semester – Annexure-IX
9. The proposed syllabus for the course titled "Electromagnetic Field Theory and Transmission Lines" offered to the ECE branch in the II year II Semester – Annexure-X
10. The proposed syllabus for the course titled "Microprocessors and Microcontrollers" offered to the ECE branch in the II year II Semester – Annexure-XI
11. The proposed syllabus for the course titled "Digital System Design Lab" offered to the ECE branch in the II year II Semester – Annexure-XII
12. The proposed syllabus for the course titled "Microprocessors and Microcontrollers Lab" offered to the ECE branch in the II year II Semester – Annexure-XIII
13. The proposed syllabus for the course titled "Analog Communications" offered to the ECE branch in the III year I Semester – Annexure-XIV
14. The proposed syllabus for the course titled "Antennas and Wave Propagation" offered to the ECE branch in the III year I Semester – Annexure-XV
15. The proposed syllabus for the course titled "VLSI Design" offered to the ECE branch in the III year I Semester – Annexure-XVI
16. The proposed syllabus for the course titled "Analog Communication lab" offered to the ECE branch in the III year I Semester – Annexure-XVII
17. The proposed syllabus for the course titled "VLSI Lab" offered to the ECE branch in the III year I Semester – Annexure-XVIII
18. The proposed syllabus for the course titled "Digital Communications" offered to the ECE branch in the III year II Semester – Annexure-XIX
19. The proposed syllabus for the course titled "Digital Signal Processing" offered to the ECE branch in the III year II Semester – Annexure-XX
20. The proposed syllabus for the course titled "Microwave Engineering" offered to the ECE branch in the III year II Semester – Annexure-XXI
21. The proposed syllabus for the course titled "Digital Communication Lab" offered to the ECE branch in the III year II Semester – Annexure-XXII
22. The proposed syllabus for the course titled "Digital Signal Processing Lab" offered to the ECE branch in the III year II Semester – Annexure-XXIII
23. The proposed syllabus for the course titled "Antennas and Microwave Engineering Lab" offered to the ECE branch in the III year II Semester – Annexure-XXIV

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24. The proposed syllabus for the course titled "IoT applications" offered to the ECE, CSE(AI&ML) & CSE branch in the III year II/ I Semester – Annexure-XXV
25. The proposed syllabus for the course titled "Design Thinking, Innovation and Entrepreneurship" offered to the ECE branch in the III year II Semester – Annexure-XXVI

Item-3 : Approval of the syllabus of Professional Elective courses

Resolution No: GVPCEW(A)/BOS-2/ECE/2024/3

It is resolved to recommend to the Academic Council that the following Program Elective courses offered for B.Tech ECE Program to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Advanced Microprocessors" offered to the ECE branch as Program Elective Course – Annexure-XXVII
2. The proposed syllabus for the course titled "Analog and Digital IC Design" offered to the ECE branch as Program Elective Course – Annexure-XXVIII
3. The proposed syllabus for the course titled "Cellular Mobile Communication" offered to the ECE branch as Program Elective Course – Annexure-XXIX
4. The proposed syllabus for the course titled "Computer Architecture & Organization" offered to the ECE branch as Program Elective Course – Annexure-XXX
5. The proposed syllabus for the course titled "Data Networks" offered to the ECE branch as Program Elective Course – Annexure- XXXI
6. The proposed syllabus for the course titled "Digital Image Processing" offered to the ECE branch as Program Elective Course – Annexure- XXXII
7. The proposed syllabus for the course titled "Electronic Measurements and Instrumentation" offered to the ECE branch as Program Elective Course – Annexure- XXXIII
8. The proposed syllabus for the course titled "Embedded Systems" offered to the ECE branch as Program Elective Course – Annexure- XXXIV
9. The proposed syllabus for the course titled "Fibre Optic Communication" offered to the ECE branch as Program Elective Course – Annexure-XXXV
10. The proposed syllabus for the course titled "FPGA Design" offered to the ECE branch as Program Elective Course – Annexure-XXXVI
11. The proposed syllabus for the course titled "Global Positioning System" offered to the ECE branch as Program Elective Course – Annexure-XXXVII
12. The proposed syllabus for the course titled "Low Power VLSI Design" offered to the ECE branch as Program Elective Course – Annexure-XXXVIII
13. The proposed syllabus for the course titled "Radar Engineering" offered to the ECE branch as Program Elective Course – Annexure-XXXIX
14. The proposed syllabus for the course titled "RTL Design Verification" offered to the ECE branch as Program Elective Course – Annexure-XL
15. The proposed syllabus for the course titled "Satellite Communication" offered to the ECE branch as Program Elective Course – Annexure-XLI
16. The proposed syllabus for the course titled "Statistical Data Analysis" offered to the ECE branch as Program Elective Course – Annexure-XLII

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Item-4 : Approval of the syllabus of Open Elective courses & Other department courses offered by ECE

Resolution No: GVPCEW(A)/BOS-2/ECE/2024/4

It is resolved to recommend to the Academic Council that the following Open Elective courses and other department courses offered by ECE Program to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Basic VLSI Design" offered as open elective to the other departments – Annexure-XLIII
2. The proposed syllabus for the course titled "Basics of Signal Processing" offered as open elective to the other departments – Annexure-XLIV
3. The proposed syllabus for the course titled "Data Communication" offered as open elective to the other departments – Annexure-XLV
4. The proposed syllabus for the course titled "Microprocessor & Controllers with Interfacing" offered as open elective to the other departments – Annexure-XLVI
5. The proposed syllabus for the course titled "Analog and Digital Circuits" offered to EEE branch in the II year I Semester – Annexure-XLVII
6. The proposed syllabus for the course titled "Analog and Digital Circuits Lab" offered to EEE branch in the II year I Semester – Annexure-XLVIII
7. The proposed syllabus for the course titled "Basics of Signals and Systems" offered to EEE branch as Program Elective Course – Annexure-XLIX
8. The proposed syllabus for the course titled "Embedded Systems Design" offered to EEE branch as Honors Course – Annexure-L

Item-5 : Approval of the subjects & syllabus related to Minor program in ECE

Resolution No: GVPCEW(A)/BOS-2/ECE/2024/5

It is resolved to recommend to the Academic Council that the following courses offered for Minor Program in ECE to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Analog and Digital Communication Systems" offered as Minor course in ECE – Annexure-LI
2. The proposed syllabus for the course titled "Digital System Modeling Through Verilog" offered as Minor course in ECE – Annexure-LII
3. The proposed syllabus for the course titled "Embedded C Programming" offered as Minor course in ECE – Annexure-LIII
4. The proposed syllabus for the course titled "Information Theory and Coding" offered as Minor course in ECE – Annexure-LIV
5. The proposed syllabus for the course titled "Mobile Cellular Communication" offered as Minor course in ECE – Annexure-LV

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Item-6 : Approval of the subjects & syllabus related to Honor program in ECE

Resolution No: GVPCEW(A)/BOS-2/ECE/2024/6

It is resolved to recommend to the Academic Council that the following courses offered for Honor Program in ECE to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "5G communication" offered as Honors course in ECE – Annexure-LVI
2. The proposed syllabus for the course titled "Application Specific Integrated Circuit" offered as Honors course in ECE – Annexure-LVII
3. The proposed syllabus for the course titled "Bio Medical Signal Processing" offered as Honors course in ECE – Annexure-LVIII
4. The proposed syllabus for the course titled "Design for Testability" offered as Honors course in ECE – Annexure-LIX
5. The proposed syllabus for the course titled "DSP Processors and Architectures" offered as Honors course in ECE – Annexure-LX
6. The proposed syllabus for the course titled "Wireless Sensor Network" offered as Honors course in ECE – Annexure-LXI

Item-7: Approval of Course Structure & syllabus of IInd Year MTech

Resolution No: GVPCEW(A)/BOS-2/ECE/2024/7

It is resolved to recommend to the Academic Council that the following Course structure & courses offered for II year M.Tech VLSI Design & Embedded Sytems Program in ECE to be effective from 2024 admitted batch onwards for approval.

1. It has been resolved to recommend to the Academic Council for approval, the course structure of 2nd year M. Tech Program as outlined in Annexure- LXII.
2. The proposed syllabus for the course titled "Memory Technologies" offered to the VLSID&ES branch in the II year I Semester as Program Elective Course– Annexure LXIII
3. The proposed syllabus for the course titled "Programming Languages for Embedded Software" offered to the VLSID&ES branch in the II year I Semester as Program Elective Course– Annexure LXIV
4. The proposed syllabus for the course titled "Universal Verification Methodologies" offered to the VLSID&ES branch in the II year I Semester as Program Elective Course– Annexure LXV

Resolution No: GVPCEW(A)/BOS-2/ECE/2024/8

The Board Members unanimously authorize the Chairperson to make minor modifications in the title/content of a course if necessary.

The meeting concluded by thanking all the members.

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DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING
G V P COLLEGE OF ENGINEERING FOR WOMEN
MADHURAWADA, VISAKHAPATNAM – 530 048

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous)
(Approved by AICTE, New Delhi and Permanently Affiliated to Andhra University, Visakhapatnam)
Madhurawada :: Visakhapatnam – 530 048

Members Present:

Name of the Member	Designation	Signature
Dr.P.M.K.Prasad	Chairperson, BoS and Head, Dept of ECE	
Dr.L.Ganesh	Associate Professor	
Dr.B.Vijayalakshmi	Associate Professor	
Dr.D.V.A.N.Ravikumar	Associate Professor	
Ms. B V S Renuka Devi	Assistant Professor	
Ms.Ch.Sirisha	Assistant Professor	
Dr.M.Manikumari	Assistant Professor	
Mr.N.V.Maheswara Rao	Assistant Professor	
Ms.B.Lakshmi	Assistant Professor	
Ms.L.Sarika	Assistant Professor	
Mr.R.Sunil Kumar	Assistant Professor	
Mr.PVK Chaitanya	Assistant Professor	
Ms.N.Roopavathi	Assistant Professor	
Ms.B.Divyasathi	Assistant Professor	
Dr.P.V.Dileep Bhumireddi	Assistant Professor	
Ms. R Jalaja	Assistant Professor	
Ms.B.V.R.Gowri	Assistant Professor	
Prof.Tapan Kumar Gandhi	Subject Expert	
Prof.Venkata Mani V.	Subject Expert	
Prof.P.Rajesh Kumar	Vice Chancellor's Nominee	
Sri A.Venkata Krishna	Industry Representative	
Ms.Krishna Deepika Chittela	College Alumni	Ch. K. Deepika
Sri Amal Raj Pukkella	Expert for Special Courses	

Chairperson , BoS

HEAD
DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING
G V P COLLEGE OF ENGINEERING FOR WOMEN
MADHURAWADA, VISAKHAPATNAM – 530 048

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous)
(Approved by AICTE, New Delhi and Permanently Affiliated to Andhra University, Visakhapatnam)
Madhurawada :: Visakhapatnam – 530 048

Members Present:

Name of the Member	Designation	Signature
Dr.P.M.K.Prasad	Chairperson, BoS and Head, Dept of ECE	
Dr.L.Ganesh	Associate Professor	
Dr.B.Vijayalakshmi	Associate Professor	
Dr.D.V.A.N.Ravikumar	Associate Professor	
Ms. B V S Renuka Devi	Assistant Professor	
Ms.Ch.Sirisha	Assistant Professor	
Dr.M.Manikumari	Assistant Professor	
Mr.N.V.Maheswara Rao	Assistant Professor	
Ms.B.Lakshmi	Assistant Professor	
Ms.L.Sarika	Assistant Professor	
Mr.R.Sunil Kumar	Assistant Professor	
Mr.PVK Chaitanya	Assistant Professor	
Ms.N.Roopavathi	Assistant Professor	
Ms.B.Divyasathi	Assistant Professor	
Dr.P.V.Dileep Bhumireddi	Assistant Professor	
Ms. R Jalaja	Assistant Professor	
Ms.B.V.R.Gowri	Assistant Professor	
Prof.Tapan Kumar Gandhi	Subject Expert	
Prof.Venkata Mani V.	Subject Expert	
Prof.P.Rajesh Kumar	Vice Chancellor's Nominee	
Sri A.Venkata Krishna	Industry Representative	
Ms.Krishna Deepika Chittela	College Alumni	Ch.K.Deepika
Sri Amal Raj Pukkella	Expert for Special Courses	

Chairperson , BoS

HEAD
DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING
G.V.P COLLEGE OF ENGINEERING FOR WOMEN
MADHURAWADA, VISAKHAPATNAM -- 53

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (AI &ML)

Date: 03/08/2024

Minutes of 1st meeting of the Board of Studies in Computer Science and Engineering (AI &ML) department on 3rd August 2024 (Saturday) at 1.00 PM in hybrid mode.

The meeting of the Board of Studies in Computer Science and Engineering (AI &ML) department of Gayatri Vidya Parishad College of Engineering for Women (Autonomous) is held on 3rd August 2024(Saturday) from 1.00 PM onwards to finalize the syllabi of the first year (1st semester and 2nd semester) courses of all B. Tech Programs offered by the Department of Electrical and Electronics Engineering under the regulations R – 2024 from the academic year 2024-25 onwards.

Members not present:

Mr. Rajesh Srinivasan, Vice President, CGI India	Expert for Special Courses

Members Present:

Person in Chair: Dr. D. K. Bebarta, HoD-CSE (AI&ML)

External Members:

Prof. S Vizianandа Row, Professor, Computer Science and Systems Engineering, Andhra University, Visakhapatnam	Vice Chancellor's Nominee	Offline
Dr. Debi Prosad Dogra, Asso. Professor, IIT Bhubaneswar	Subject Expert	Online
Dr. Anjali Mahapatra, Asst. Professor, IIIT, Bhubaneswar	Subject Expert	Online
Dr M Subrahmanya Sarma, Vice President, Accenture	Industry Representative	Online
Mrs. Vivekitha Sagi, Lead Quality Engineer, Persistent Systems	Expert for Special Courses	Offline

Internal Members:

Dr. M R K Krishna Rao, Professor	BoS Member	Offline
Dr. K Purushotam Naidu, Assistant Professor	BoS Member	Offline
Mrs. D. B. Santhoshi Assistant Professor	BoS Member	Offline
Mrs. H Gouthami Assistant Professor	BoS Member	Offline
Mr. P Siva Assistant Professor	BoS Member	Offline
Mrs. Sujatha Mudadla Assistant Professor	BoS Member	Offline

The joint Board of Studies meeting started with a welcome note by the Principal in the presence of BoS Chairmen, and Academic Council members wherein the salient features of the regulations R-2024 were highlighted. Next, the Principal requests the different Department of Board Chairman to discuss and approve the proposed syllabi of the first-year courses under R – 2024 regulations offered for various B. Tech Programs and M. Tech Programs (if applicable) from the academic year 2024-25.

The Board of Studies meeting of the Department of Computer Science and Engineering (AI &ML) started with a welcome note by the Chairman wherein he presented an outline of the regulations R-2024 and requested the Board to discuss and approve the proposed syllabi.

After serious and fruitful deliberations on the proposed syllabi of the courses under R – 2024 regulations offered by the Department of Computer Science and Engineering (AI &ML) for B. Tech Programs from the academic year 2024-25 onwards, the Board agreed to offer courses for different B. Tech programs as requested by the Chairman of the respective BoS of other Engineering Departments. The Board unanimously resolved the following:

Resolution No: GVPCEW(A)/BOS/CSM/2024/1

It is resolved to recommend to the Academic Council that the following courses offered for B. Tech Programs to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course "Python Programming" offered to the CSE (AI&ML) branch in the I year II Semester. **Annexure-I**
2. The proposed syllabus for the course titled "Fundamentals of Computers" offered to the CSE (AI&ML) branch in the I year I Semester. **Annexure-II**
3. The proposed syllabus for the course "Python Programming Lab" offered to the CSE (AI&ML) branch in the I year II Semester. **Annexure-III**
4. The proposed syllabus for the course titled "Computer Engineering Workshop" offered to the CSE (AI&ML) branch in the I year I Semester – **Annexure-IV**
5. The proposed syllabus for the course "Problem solving using C" offered to the CSE (AI&ML) branch in the I year I Semester. **Annexure-V**
6. The proposed syllabus for the course titled "Web Technologies Fundamentals Lab" offered to the CSE (AI&ML) branch in the I year II Semester. **Annexure-VI**
7. The proposed syllabus for the course "Problem solving using C Lab" offered to the CSE (AI&ML) branch in the I year I Semester. **Annexure-VII**

Resolution No: GVPCEW(A)/BOS/CSM/2024/2

The Board Members unanimously authorize the Chairman to make minor modifications in the title/content of a course if necessary.

The meeting is concluded by thanking all the BoS members present in online or offline mode.

Members Present:

BoS Member's Name	Designation	Signature
Dr. D. K. Bebarta, HoD-CSE (AI&ML)	Chairman	
Dr. M R K Krishna Rao, Professor	BoS Member	
Dr. K Purushotam Naidu, Assistant Professor	BoS Member	
Mrs. D. B. Santhoshi Assistant Professor	BoS Member	
Mrs. H Gouthami Assistant Professor	BoS Member	
Mr. P Siva Assistant Professor	BoS Member	
Mrs. Sujatha Mudadla Assistant Professor	BoS Member	
Prof. S Viziananda Row, Professor, Computer Science and Systems Engineering, Andhra University, Visakhapatnam	Vice Chancellor's Nominee	
Dr. Debi Prosad Dogra, Asso. Professor, IIT Bhubaneswar	Subject Expert	
Dr. Anjali Mahapatra, Asst. Professor, IIIT, Bhubaneswar	Subject Expert	
Dr M Subrahmanya Sarma, Vice President, Accenture	Industry Representative	
Mr. Rajesh Srinivasan, Vice President, CGI India	Expert for Special Courses	
Mrs. Vivekitha Sagi, Lead Quality Engineer, Persistent Systems	College Alumni	

Dr. Dwiti Krishna Bebarta
HoD-CSE (AI&ML)

Resolution No: GVPCEW(A)/BOS/CSM/2024/2

The Board Members unanimously authorize the Chairman to make minor modifications in the title/content of a course if necessary.

The meeting is concluded by thanking all the BoS members present in online or offline mode.

Members Present:

BoS Member's Name	Designation	Signature
Dr. D. K. Bebarta, HoD-CSE (AI&ML)	Chairman	
Dr. M R K Krishna Rao, Professor	BoS Member	
Dr. K Purushotam Naidu, Assistant Professor	BoS Member	
Mrs. D. B. Santhoshi Assistant Professor	BoS Member	
Mrs. H Gouthami Assistant Professor	BoS Member	
Mr. P Siva Assistant Professor	BoS Member	
Mrs. Sujatha Mudadla Assistant Professor	BoS Member	
Prof. S Viziananda Row, Professor, Computer Science and Systems Engineering, Andhra University, Visakhapatnam	Vice Chancellor's Nominee	
Dr. Debi Prosad Dogra, Asso. Professor, IIT Bhubaneswar	Subject Expert	Debi Prosad Dogra
Dr. Anjali Mahapatra, Asst. Professor, IIIT, Bhubaneswar	Subject Expert	
Dr M Subrahmanya Sarma, Vice President, Accenture	Industry Representative	
Mr. Rajesh Srinivasan, Vice President, CGI India	Expert for Special Courses	
Mrs. Vivekitha Sagi, Lead Quality Engineer, Persistent Systems	College Alumni	

Dr. Dwiti Krishna Bebarta
HoD-CSE (AI&ML)

Resolution No: GVPCEW(A)/BOS/CSM/2024/2

The Board Members unanimously authorize the Chairman to make minor modifications in the title/content of a course if necessary.

The meeting is concluded by thanking all the BoS members present in online or offline mode.

Members Present:

BoS Member's Name	Designation	Signature
Dr. D. K. Bebarta, HoD-CSE (AI&ML)	Chairman	
Dr. M R K Krishna Rao, Professor	BoS Member	
Dr. K Purushotam Naidu, Assistant Professor	BoS Member	
Mrs. D. B. Santhoshi Assistant Professor	BoS Member	
Mrs. H Gouthami Assistant Professor	BoS Member	
Mr. P Siva Assistant Professor	BoS Member	
Mrs. Sujatha Mudadla Assistant Professor	BoS Member	
Prof. S Viziananda Row, Professor, Computer Science and Systems Engineering, Andhra University, Visakhapatnam	Vice Chancellor's Nominee	
Dr. Debi Prosad Dogra, Asso. Professor, IIT Bhubaneswar	Subject Expert	
Dr. Anjali Mahapatra, Asst. Professor, IIIT, Bhubaneswar	Subject Expert	Anjali Mohapatra. 03/08/2024
Dr M Subrahmanya Sarma, Vice President, Accenture	Industry Representative	
Mr. Rajesh Srinivasan, Vice President, CGI India	Expert for Special Courses	
Mrs. Vivekitha Sagi, Lead Quality Engineer, Persistent Systems	College Alumni	

Dr. Dwiti Krishna Bebarta
HoD-CSE (AI&ML)

Resolution No: GVPCEW(A)/BOS/CSM/2024/2

The Board Members unanimously authorize the Chairman to make minor modifications in the title/content of a course if necessary.

The meeting is concluded by thanking all the BoSmembers present in online or offline mode.

Members Present:

BoS Member's Name	Designation	Signature
Dr. D. K. Bebarta, HoD-CSE (AI&ML)	Chairman	
Dr. M R K Krishna Rao, Professor	BoS Member	
Dr. K Purushotam Naidu, Assistant Professor	BoS Member	
Mrs. D. B. Santhoshi Assistant Professor	BoS Member	
Mrs. H Gouthami Assistant Professor	BoS Member	
Mr. P Siva Assistant Professor	BoS Member	
Mrs. SujathaMudadla Assistant Professor	BoS Member	
Prof. S Viziananda Row, Professor, Computer Science and Systems Engineering, Andhra University, Visakhapatnam	Vice Chancellor's Nominee	
Dr. Debi ProsadDogra, Asso. Professor, IIT Bhubaneswar	Subject Expert	
Dr. Anjali Mahapatra, Asst. Professor, IIIT, Bhubaneswar	Subject Expert	
Dr M SubrahmanyaSarma, Vice President, Accenture	Industry Representative	M S Sarma
Mr. Rajesh Srinivasan, Vice President, CGI India	Expert for Special Courses	
Mrs. VivekithaSagi, Lead Quality Engineer, Persistent Systems	College Alumni	

Dr. Dwiti Krishna Bebarta

HoD-CSE (AI&ML)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (AI &ML)

Date: 03/08/2024

Minutes of 1st meeting of the Board of Studies in Computer Science and Engineering (AI &ML) department on 3rd August 2024 (Saturday) at 1.00 PM in hybrid mode.

The meeting of the Board of Studies in Computer Science and Engineering (AI &ML) department of Gayatri Vidya Parishad College of Engineering for Women (Autonomous) is held on 3rd August 2024(Saturday) from 1.00 PM onwards to finalize the syllabi of the first year (1st semester and 2nd semester) courses of all B. Tech Programs offered by the Department of Electrical and Electronics Engineering under the regulations R – 2024 from the academic year 2024-25 onwards.

Members not present:

Mr. Rajesh Srinivasan, Vice President, CGI India	Expert for Special Courses

Members Present:

Person in Chair: Dr. D. K. Bebarta, HoD-CSE (AI&ML)

External Members:

Prof. S Vizianandа Row, Professor, Computer Science and Systems Engineering, Andhra University, Visakhapatnam	Vice Chancellor's Nominee	Offline
Dr. Debi Prosad Dogra, Asso. Professor, IIT Bhubaneswar	Subject Expert	Online
Dr. Anjali Mahapatra, Asst. Professor, IIIT, Bhubaneswar	Subject Expert	Online
Dr M Subrahmanya Sarma, Vice President, Accenture	Industry Representative	Online
Mrs. Vivekitha Sagi, Lead Quality Engineer, Persistent Systems	Expert for Special Courses	Offline

Internal Members:

Dr. M R K Krishna Rao, Professor	BoS Member	Offline
Dr. K Purushotam Naidu, Assistant Professor	BoS Member	Offline
Mrs. D. B. Santhoshi Assistant Professor	BoS Member	Offline
Mrs. H Gouthami Assistant Professor	BoS Member	Offline
Mr. P Siva Assistant Professor	BoS Member	Offline
Mrs. Sujatha Mudadla Assistant Professor	BoS Member	Offline

The joint Board of Studies meeting started with a welcome note by the Principal in the presence of BoS Chairmen, and Academic Council members wherein the salient features of the regulations R-2024 were highlighted. Next, the Principal requests the different Department of Board Chairman to discuss and approve the proposed syllabi of the first-year courses under R – 2024 regulations offered for various B. Tech Programs and M. Tech Programs (if applicable) from the academic year 2024-25.

The Board of Studies meeting of the Department of Computer Science and Engineering (AI &ML) started with a welcome note by the Chairman wherein he presented an outline of the regulations R-2024 and requested the Board to discuss and approve the proposed syllabi.

After serious and fruitful deliberations on the proposed syllabi of the courses under R – 2024 regulations offered by the Department of Computer Science and Engineering (AI &ML) for B. Tech Programs from the academic year 2024-25 onwards, the Board agreed to offer courses for different B. Tech programs as requested by the Chairman of the respective BoS of other Engineering Departments. The Board unanimously resolved the following:

Resolution No: GVPCEW(A)/BOS/CSM/2024/1

It is resolved to recommend to the Academic Council that the following courses offered for B. Tech Programs to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course "Python Programming" offered to the CSE (AI&ML) branch in the I year II Semester. **Annexure-I**
2. The proposed syllabus for the course titled "Fundamentals of Computers" offered to the CSE (AI&ML) branch in the I year I Semester. **Annexure-II**
3. The proposed syllabus for the course "Python Programming Lab" offered to the CSE (AI&ML) branch in the I year II Semester. **Annexure-III**
4. The proposed syllabus for the course titled "Computer Engineering Workshop" offered to the CSE (AI&ML) branch in the I year I Semester – **Annexure-IV**
5. The proposed syllabus for the course "Problem solving using C" offered to the CSE (AI&ML) branch in the I year I Semester. **Annexure-V**
6. The proposed syllabus for the course titled "Web Technologies Fundamentals Lab" offered to the CSE (AI&ML) branch in the I year II Semester. **Annexure-VI**
7. The proposed syllabus for the course "Problem solving using C Lab" offered to the CSE (AI&ML) branch in the I year I Semester. **Annexure-VII**

Resolution No: GVPCEW(A)/BOS/CSM/2024/2

The Board Members unanimously authorize the Chairman to make minor modifications in the title/content of a course if necessary.

The meeting is concluded by thanking all the BoS members present in online or offline mode.

Members Present:

BoS Member's Name	Designation	Signature
Dr. D. K. Bebarta, HoD-CSE (AI&ML)	Chairman	
Dr. M R K Krishna Rao, Professor	BoS Member	
Dr. K Purushotam Naidu, Assistant Professor	BoS Member	
Mrs. D. B. Santhoshi Assistant Professor	BoS Member	
Mrs. H Gouthami Assistant Professor	BoS Member	
Mr. P Siva Assistant Professor	BoS Member	
Mrs. Sujatha Mudadla Assistant Professor	BoS Member	
Prof. S Viziananda Row, Professor, Computer Science and Systems Engineering, Andhra University, Visakhapatnam	Vice Chancellor's Nominee	
Dr. Debi Prosad Dogra, Asso. Professor, IIT Bhubaneswar	Subject Expert	
Dr. Anjali Mahapatra, Asst. Professor, IIIT, Bhubaneswar	Subject Expert	
Dr M Subrahmanya Sarma, Vice President, Accenture	Industry Representative	
Mr. Rajesh Srinivasan, Vice President, CGI India	Expert for Special Courses	
Mrs. Vivekitha Sagi, Lead Quality Engineer, Persistent Systems	College Alumni	

Dr. Dwiti Krishna Bebarta
HoD-CSE (AI&ML)

Resolution No: GVPCEW(A)/BOS/CSM/2024/2

The Board Members unanimously authorize the Chairman to make minor modifications in the title/content of a course if necessary.

The meeting is concluded by thanking all the BoS members present in online or offline mode.

Members Present:

BoS Member's Name	Designation	Signature
Dr. D. K. Bebarta, HoD-CSE (AI&ML)	Chairman	
Dr. M R K Krishna Rao, Professor	BoS Member	
Dr. K Purushotam Naidu, Assistant Professor	BoS Member	
Mrs. D. B. Santhoshi Assistant Professor	BoS Member	
Mrs. H Gouthami Assistant Professor	BoS Member	
Mr. P Siva Assistant Professor	BoS Member	
Mrs. Sujatha Mudadla Assistant Professor	BoS Member	
Prof. S Viziananda Row, Professor, Computer Science and Systems Engineering, Andhra University, Visakhapatnam	Vice Chancellor's Nominee	
Dr. Debi Prosad Dogra, Asso. Professor, IIT Bhubaneswar	Subject Expert	Debi Prosad Dogra
Dr. Anjali Mahapatra, Asst. Professor, IIIT, Bhubaneswar	Subject Expert	
Dr M Subrahmanya Sarma, Vice President, Accenture	Industry Representative	
Mr. Rajesh Srinivasan, Vice President, CGI India	Expert for Special Courses	
Mrs. Vivekitha Sagi, Lead Quality Engineer, Persistent Systems	College Alumni	

Dr. Dwiti Krishna Bebarta
HoD-CSE (AI&ML)

Resolution No: GVPCEW(A)/BOS/CSM/2024/2

The Board Members unanimously authorize the Chairman to make minor modifications in the title/content of a course if necessary.

The meeting is concluded by thanking all the BoS members present in online or offline mode.

Members Present:

BoS Member's Name	Designation	Signature
Dr. D. K. Bebarta, HoD-CSE (AI&ML)	Chairman	
Dr. M R K Krishna Rao, Professor	BoS Member	
Dr. K Purushotam Naidu, Assistant Professor	BoS Member	
Mrs. D. B. Santhoshi Assistant Professor	BoS Member	
Mrs. H Gouthami Assistant Professor	BoS Member	
Mr. P Siva Assistant Professor	BoS Member	
Mrs. Sujatha Mudadla Assistant Professor	BoS Member	
Prof. S Viziananda Row, Professor, Computer Science and Systems Engineering, Andhra University, Visakhapatnam	Vice Chancellor's Nominee	
Dr. Debi Prosad Dogra, Asso. Professor, IIT Bhubaneswar	Subject Expert	
Dr. Anjali Mahapatra, Asst. Professor, IIIT, Bhubaneswar	Subject Expert	Anjali Mohapatra. 03/08/2024
Dr M Subrahmanya Sarma, Vice President, Accenture	Industry Representative	
Mr. Rajesh Srinivasan, Vice President, CGI India	Expert for Special Courses	
Mrs. Vivekitha Sagi, Lead Quality Engineer, Persistent Systems	College Alumni	

Dr. Dwiti Krishna Bebarta
HoD-CSE (AI&ML)

Resolution No: GVPCEW(A)/BOS/CSM/2024/2

The Board Members unanimously authorize the Chairman to make minor modifications in the title/content of a course if necessary.

The meeting is concluded by thanking all the BoSmembers present in online or offline mode.

Members Present:

BoS Member's Name	Designation	Signature
Dr. D. K. Bebarta, HoD-CSE (AI&ML)	Chairman	
Dr. M R K Krishna Rao, Professor	BoS Member	
Dr. K Purushotam Naidu, Assistant Professor	BoS Member	
Mrs. D. B. Santhoshi Assistant Professor	BoS Member	
Mrs. H Gouthami Assistant Professor	BoS Member	
Mr. P Siva Assistant Professor	BoS Member	
Mrs. SujathaMudadla Assistant Professor	BoS Member	
Prof. S Viziananda Row, Professor, Computer Science and Systems Engineering, Andhra University, Visakhapatnam	Vice Chancellor's Nominee	
Dr. Debi ProsadDogra, Asso. Professor, IIT Bhubaneswar	Subject Expert	
Dr. Anjali Mahapatra, Asst. Professor, IIIT, Bhubaneswar	Subject Expert	
Dr M SubrahmanyaSarma, Vice President, Accenture	Industry Representative	M S Sarma
Mr. Rajesh Srinivasan, Vice President, CGI India	Expert for Special Courses	
Mrs. VivekithaSagi, Lead Quality Engineer, Persistent Systems	College Alumni	

Dr. Dwiti Krishna Bebarta

HoD-CSE (AI&ML)

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous)
(Approved by AICTE, New Delhi and Permanently Affiliated to Andhra University, Visakhapatnam)
Madhurawada :: Visakhapatnam – 530 048

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Minutes of 1st meeting of the Board of Studies in Electrical and Electronics Engineering department on 3rd August 2024(Saturday) at 1 PM in hybrid mode

The meeting of the Board of Studies in Electrical and Electronics Engineering department of Gayatri Vidya Parishad College of Engineering for Women (Autonomous) is held on 3rd August 2024(Saturday) from 1 PM onwards to finalize the syllabi of the first year (1st semester and 2nd semester) courses of all B.Tech Programs offered by the Department of Electrical and Electronics Engineering under the regulations R–2024 from the academic year 2024-25 onwards.

Members Present:

Dr R V S Lakshmi Kumari - Chairperson

External Members:

1	Dr K Srikumar, Professor, Dept of EEE JNTU-GV, Vizianagaram	Subject Expert	Offline
2	Dr A Hemachander, Assistant Professor, Dept of EEE NIT-Puducherry, Puducherry	Subject Expert	Online
3	Dr P Mallikarjuna Rao, Professor & Head of the Dept of Electrical & Electronics Engineering, AU College of Engineering, Visakhapatnam	Vice Chancellor's Nominee	Online
4	Dr M Santhosh Kumar, System Design Engineer Sensata Technologies, Pune	Industry Representative	Online
5	Ms Ch Vijayalakshmi, Junior Electrical Engineer ACUTRONIC India Pvt Ltd Hyderabad	College Alumni	Offline
6	Ms I Kavya, Associate Senior Electrical Engineer Burnsand Mc Donnells India Pvt Ltd Bangalore	Expert for Special Courses	Offline

Internal Members:

1	Dr. P. Devendra	Associate Professor	Offline
2	Dr ASV Vijaya Lakshmi	Assistant Professor	Offline
3	Dr M Krishna	Assistant Professor	Offline

4	Mrs V Sree Vidhya	Assistant Professor	Offline
5	Mr Y Ramu	Assistant Professor	Offline
6	Mr D Srinivas Reddy	Assistant Professor	Offline
7	Ms P Sai Jyothi	Assistant Professor	Offline
8	Mrs B Kusuma Kumari	Assistant Professor	Offline
9	Mr A Srinivasa Rao	Assistant Professor	Offline
10	Ms P Hemalatha	Assistant Professor	Offline

The meeting started with a welcome note by the Principal & Chairman, Academic Council wherein the salient features of the regulations R-2024 was highlighted to joint Board of Studies. Next, the Principal requested the different Department Board Chairmen/Chairpersons to discuss and approve the proposed syllabi of the first year courses under R–2024 regulations offered for various B.Tech Programs and M.Tech Programs (if applicable) from the academic year 2024-25.

The Board of Studies meeting of the Department of Electrical and Electronics Engineering started with a welcome note by the Chairperson wherein she presented a outline of the regulations R-2024 and requested the Board to discuss and approve the proposed syllabi.

After serious and fruitful deliberations on the proposed syllabi of the courses under R–2024 regulations offered by the Department of Electrical and Electronics Engineering for B.Tech Programs from the academic year 2024-25 onwards, the Board agreed to offer courses for different B.Tech programs as requested by the Chairperson of the respective BoS of other Engineering Departments. The Board unanimously resolved the following:

Resolution No: GVPCEW(A)/BOS/EEE/2024/1

It is resolved to recommend to the Academic Council that the following courses offered for B.Tech Programs to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Fundamentals of Electrical Engineering" offered to the EEE branch in the I year I Semester – ***Annexure-I***
2. The proposed syllabus for the course titled "Electrical Circuits - 1" offered to the EEE branch in the I year II Semester – ***Annexure-II***
3. The proposed syllabus for the course titled "Thermal & Hydro Prime Movers" offered to the EEE branch in the I year II Semester – ***Annexure-III***
4. The proposed syllabus for the practical course titled "Electrical Engineering Workshop" offered to the EEE branch in the I year II Semester – ***Annexure-IV***
5. The proposed syllabus for the course titled "Network Theory and Machines" offered to the ECE branch in the I year I Semester – ***Annexure-V***

Resolution No: GVPCEW(A)/BOS/EEE/2024/2

The Board Members unanimously authorize the Chairperson to make minor modifications in the title/content of a course if necessary.

The meeting concluded by thanking all the members.

Members Present:

Name of the Member	Designation	Signature
Dr R V S Lakshmi Kumari	Chairperson, BoS and Head, Dept of EEE	RVSL 3/8/24
Dr. P. Devendra	Associate Professor	
Dr ASV Vijaya Lakshmi	Assistant Professor	
Dr M Krishna	Assistant Professor	
Mrs V Sree Vidhya	Assistant Professor	
Mr Y Ramu	Assistant Professor	
Mr D Srinivas Reddy	Assistant Professor	
Ms P Sai Jyothi	Assistant Professor	
Mrs B Kusuma Kumari	Assistant Professor	
Mr A Srinivasa Rao	Assistant Professor	
Ms P Hemalatha	Assistant Professor	
Dr K Srikumar	Subject Expert	3/8/24
Dr A Hemachander	Subject Expert	
Dr P Mallikarjuna Rao	Vice Chancellor's Nominee	
Dr M Santhosh Kumar	Industry Representative	
Ms Ch Vijayalakshmi	College Alumni	
Ms I Kavya	Expert for Special Courses	

RVSL 3/8/24

Head
Dept. of Electrical & Electronics Engineering
G.V.P. College of Engineering for Women
Madhurawada
VISAKHAPATNAM-530 048

Chairperson, BoS

Members Present:

Name of the Member	Designation	Signature
Dr R V S Lakshmi Kumari	Chairperson, BoS and Head, Dept of EEE	RVSL 3/8/24
Dr. P. Devendra	Associate Professor	
Dr ASV Vijaya Lakshmi	Assistant Professor	
Dr M Krishna	Assistant Professor	
Mrs V Sree Vidhya	Assistant Professor	
Mr Y Ramu	Assistant Professor	
Mr D Srinivas Reddy	Assistant Professor	D. Srinivas
Ms P Sai Jyothi	Assistant Professor	
Mrs B Kusuma Kumari	Assistant Professor	B. Kusuma Kumari
Mr A Srinivasa Rao	Assistant Professor	A. Srinivasa Rao
Ms P Hemalatha	Assistant Professor	Hemalatha
Dr K Srikumar	Subject Expert	3/8/24
Dr A Hemachander	Subject Expert	A. Hemachander
Dr P Mallikarjuna Rao	Vice Chancellor's Nominee	
Dr M Santhosh Kumar	Industry Representative	
Ms Ch Vijayalakshmi	College Alumni	
Ms I Kavya	Expert for Special Courses	

RVSL 3/8/24
Chairperson, BoS

Members Present:

Name of the Member	Designation	Signature
Dr R V S Lakshmi Kumari	Chairperson, BoS and Head, Dept of EEE	RVSL 3/8/24
Dr. P. Devendra	Associate Professor	
Dr ASV Vijaya Lakshmi	Assistant Professor	
Dr M Krishna	Assistant Professor	
Mrs V Sree Vidhya	Assistant Professor	
Mr Y Ramu	Assistant Professor	
Mr D Srinivas Reddy	Assistant Professor	
Ms P Sai Jyothi	Assistant Professor	
Mrs B Kusuma Kumari	Assistant Professor	
Mr A Srinivasa Rao	Assistant Professor	
Ms P Hemalatha	Assistant Professor	
Dr K Srikumar	Subject Expert	3/8/24
Dr A Hemachander	Subject Expert	
Dr P Mallikarjuna Rao	Vice Chancellor's Nominee	
Dr M Santhosh Kumar	Industry Representative	
Ms Ch Vijayalakshmi	College Alumni	
Ms I Kavya	Expert for Special Courses	

RVSL 3/8/24
Chairperson, BoS

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN

(Autonomous)

(Approved by AICTE, New Delhi and Permanently Affiliated to Andhra University, Visakhapatnam)

Madhurawada :: Visakhapatnam – 530 048

DEPARTMENT OF INFORMATION TECHNOLOGY

Minutes of 1st meeting of the Board of Studies in Information Technology department on 3rd August 2024 (Saturday) at 1 PM in hybrid mode.

The meeting of the Board of Studies in Information Technology department of Gayatri Vidya Parishad College of Engineering for Women (Autonomous) is held on 3rd August 2024 (Saturday) from 1 PM onwards to finalize the syllabi of the first year (1st semester and 2nd semester) courses of all B. Tech Programs offered by the Department of Information Technology under the regulations R – 2024 from the academic year 2024-25 onwards.

Members Present:

Dr. M. Bhanu Sridhar – Chairman & HOD, Dept. of Information Technology

External Members:

1	Prof. Kunjam Nageswara Rao Dept. of Information Technology AU College of Engineering, Visakhapatnam	Vice Chancellor's Nominee	OFFLINE
2	Prof Rashmi Ranjan Rout Professor, Dept of CSE NIT-Warangal	Subject Expert	ONLINE
3	Dr. N. Rukma Rekha Associate Professor, Dept of CSE University of Hyderabad Hyderabad	Subject Expert	OFFLINE
4	Mr. Sasidhar Maruvada Managing Director nu Vizz Software Solutions Bengaluru	Industry Representative	ONLINE
5	Ms. G. Dhana Lakshmi Assistant Professor Dept of CSE, JNTUKCE JNTUK-Kakinada	College Alumni	OFFLINE
6	Mr. Ayyalasomayajula Siva Sankar Principal Consultant/Key Product Manager, Sposea B.V., Bengaluru	Expert for Special Courses	OFFLINE

Internal Members:

1	Dr. C. Srinivas	Associate Professor	OFFLINE
2	Mrs. R. Sridevi	Assistant Professor	OFFLINE
3	Mrs. P. Sridevi,	Assistant Professor	OFFLINE
4	Mr. Ch. V. V. D. Prasad	Assistant Professor	Pursuing Ph. D in IIT Varanasi through Quality Improvement Program
5	Ms. M. Deepthi	Assistant Professor	OFFLINE
6	Mr. G. Tirupati	Assistant Professor	OFFLINE
7	Mr. G. Appaji	Assistant Professor	OFFLINE

The joint Board of Studies meeting started with a welcome note by the Principal in the presence of BoS Chairmen, and Academic Council members wherein the salient features of the regulations R-2024 were highlighted. Next, the Principal requested the different Departments' Board Chairpersons to discuss and approve the proposed syllabi of the first-year courses under R – 2024 regulations offered for various B. Tech Programs and M. Tech Programs (if applicable) from the academic year 2024-25.

The Board of Studies meeting of the Department of Information Technology started with a welcome note by the Chairman wherein he presented an outline of the regulations R-2024 and requested the Board to discuss and approve the proposed syllabi.

After serious and productive deliberations on the proposed syllabi of the courses under R – 2024 regulations offered by the Department of Information Technology for B. Tech Programs from the academic year 2024-25 onwards, the Board agreed to offer courses for different B. Tech programs as requested by the Chairman of the respective BoS of other Engineering Departments. The Board unanimously resolved the following:

Resolution No: GVPCEW(A)/BOS/IT/2024/1

It is resolved to recommend to the Academic Council that the following courses offered for B. Tech Programs to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled 'Python Programming' offered to the IT branch in the I year II Semester – Annexure-I
2. The proposed syllabus for the course titled 'Fundamentals of Computers' offered to the IT branch in the I year I Semester – Annexure-II
3. The proposed syllabus for the course titled 'Python Programming Lab' offered to the IT branch in the I year II Semester – Annexure-III
4. The proposed syllabus for the course titled 'Computer Engineering Workshop Lab' offered to the IT branch in the I year I Semester – Annexure-IV

5. The proposed syllabus for the course titled 'Problem Solving Using C' offered to the IT branch in the I year I Semester – Annexure-V
6. The proposed syllabus for the course titled 'Web Technologies Fundamentals Lab' offered to the IT branch in the I year II Semester – Annexure-VI
7. The proposed syllabus for the course titled 'Problem Solving Using C Lab' offered to the IT branch in the I year I Semester – Annexure-VII

Resolution No: GVPCEW(A)/BOS/IT/2024/2

The Board Members unanimously authorize the Chairperson to make minor modifications in the title/content of a course, if necessary.
The meeting concluded by thanking all the members.

Members Present:

Name of the Member	Designation	Signature
Dr. M. Bhanu Sridhar	Chairman of BOS and HOD, Department of Information Technology	
Prof. Kunjam Nageswara Rao, Professor and HOD, Dept. of IT, AU, Visakhapatnam	Vice Chancellor's Nominee	
Prof. Rashmi Ranjan Rout Professor, Dept of CSE NIT-Warangal	Subject Expert	
Dr. N. Rukma Rekha Associate Professor, Dept of CSE University of Hyderabad Hyderabad	Industry Representative	
Mr. Sasidhar Maruvada Managing Director nu Vizz Software Solutions Bengaluru	College Alumni	
Ms. G. Dhana Lakshmi Assistant Professor Dept of CSE, JNTUKCE JNTUK-Kakinada	Expert for Special Courses	
Mr. Ayyalasomayajula Siva Sankar Principal Consultant/Key Product Manager, Sposea B.V., Bengaluru	BoS Member	
Dr. C. Srinivas	BoS Member	
Mrs. R. Sridevi	BoS Member	R. Sridevi
Mrs. P. Sridevi	BoS Member	P. Sridevi
Ms. M. Deepthi	BoS Member	
Mr. G. Tirupati	BoS Member	
Mr. G. Appaji	BoS Member	

Chairman, BOS
Dept. of Information Technology

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Minutes of 1st meeting of the Board of Studies in Electronics and Communication Engineering department on 3rd August 2024(Saturday) at 1 PM in hybrid mode

The meeting of the Board of Studies in Electronics and Communication Engineering department of Gayatri Vidya Parishad College of Engineering for Women (Autonomous) is held on 3rd August 2024(Saturday) from 1 PM onwards to finalize the syllabi of the first year (1st semester and 2nd semester) courses of all B.Tech Programs and first year((1st semester and 2nd semester) courses of M.Tech programs offered by the Department of Electronics and Communication Engineering under the regulations R – 2024 from the academic year 2024-25 onwards.

Members Present:

Dr P.M.K.Prasad - Chairperson

External Members:

1	Prof. Tapan Kumar Gandhi Professor, Department of Electrical Engineering Indian Institute of Technology, Delhi	Subject Expert	Online
2	Prof.Venkata Mani V. Professor Dept.of ECE, National Institute of Technology, Warangal	Subject Expert	Offline
3	Prof.P.Rajesh Kumar Professor Dept.of Electronics and Communication Engineering AU College of Engineering (A) Visakhapatnam	Vice Chancellor's Nominee	Offline
4	Sri A.Venkata Krishna CEO , Ascentsemi R & D Pvt.Ltd Bengaluru	Industry Representative	Offline
5	Ms.Krishna Deepika Chittela Staff Engineer Synoposys, Bengaluru	College Alumni	Online
6	Sri Amal Raj Pukkella Founder, Digifac Services Pvt.Ltd & COO, Headfitted Pvt Ltd Visakhapatnam	Expert for Special Courses	Offline

Internal Members:

1	Dr.L.Ganesh	Associate Professor	Offline
2	Dr.B.Vijayalakshmi	Associate Professor HEAD	Offline

DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING

3	Dr.D.V.A.N.Ravikumar	Associate Professor	Offline
4	Ms.B.V.S.Renuka Devi	Assistant Professor	On leave
5	Ms.Ch.Sirisha	Assistant Professor	Offline
6	Dr.M.Manikumari	Assistant Professor	Offline
7	Mr.N.V.Maheswara Rao	Assistant Professor	Offline
8	Ms.B.Lakshmi	Assistant Professor	Offline
9	Ms.L.Sarika	Assistant Professor	Offline
10	Mr.R.Sunil Kumar	Assistant Professor	Offline
11	Mr.PVK Chaitanya	Assistant Professor	Offline
12	Ms.N.Roopavathi	Assistant Professor	Offline
13	Ms.B.Divyasathi	Assistant Professor	Offline
14	Dr.P.V.Dileep Bhumireddi	Assistant Professor	Offline
15	Ms.R.Jalaja	Assistant Professor	Maternity leave
16	Ms.M.Hemlata	Assistant Professor	On Leave
17	Ms.BVR Gowri	Assistant Professor	Offline
18	Ms.K.Aishawrya	Assistant Professor	On leave

The meeting started with a welcome note by the Principal & Chairman, Academic Council wherein the salient features of the regulations R-2024 was highlighted to joint Board of Studies. Next, the Principal requested the different Department Board Chairmen/Chairpersons to discuss and approve the proposed syllabi of the first year courses under R – 2024 regulations offered for various B.Tech Programs and M.Tech Programs from the academic year 2024-25.

The Board of Studies meeting of the Department of Electronics and Communication Engineering started with a welcome note by the Chairperson wherein she presented a outline of the regulations R-2024 and requested the Board to discuss and approve the proposed syllabi.

After serious and fruitful deliberations on the proposed syllabi of the courses under R – 2024 regulations offered by the Department of Electronics and Communication Engineering for B.Tech and M.Tech Programs from the academic year 2024-25 onwards, the Board agreed to offer courses for different B.Tech,M.Tech programs as requested by the Chairperson of the respective BoS of other Engineering Departments. The Board unanimously resolved the following:

Resolution No: GVPCEW(A)/BOS/ECE/2024/1

It is resolved to recommend to the Academic Council that the following courses offered for B.Tech Programs to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Electronic Devices and Circuits " offered to the ECE branch in the I year I Semester – Annexure-I

2. The proposed syllabus for the course titled "Electronic Devices and Circuits Lab " offered to the ECE branch in the I year I Semester – Annexure-II

3. The proposed syllabus for the course titled "Basic Electronics Engineering " offered to the EEE branch in the I year I semester – Annexure-III

4. The proposed syllabus for the course titled "Elements of Electronics Engineering " offered to the CSM,CSE,IT branch in the I year I semester/II Semester-Annexure-IV

HEAD
DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING
G.V.P.COLLEGE OF ENGINEERING FOR WOMEN

5. The proposed syllabus for the course titled "Digital Logic Design " offered to the ECE branch in the I year II Semester – Annexure-V

6. The proposed syllabus for the course titled "Electronic Circuit Analysis " offered to the ECE branch in the I year II Semester – Annexure-VI

7. The proposed syllabus for the course titled "Digital Logic Design lab " offered to the ECE branch in the I year II Semester – Annexure-VII

8. The proposed syllabus for the course titled "Electronic Circuit Analysis lab " offered to the ECE branch in the I year II Semester – Annexure-VIII

Resolution No: GVPCEW(A)/BOS/ECE/2024/2

It is resolved to recommend to the Academic Council that the following courses offered for M.Tech Programs to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Analog and Digital CMOS VLSI Design" offered to the ECE branch in the I year I Semester – Annexure-IX

2. The proposed syllabus for the course titled "Embedded systems Design " offered to the ECE branch in the I year I Semester – Annexure-X

3. The proposed syllabus for the course titled "Application Specific Integrated Circuit(ASIC) " offered to the ECE branch in the I year I Semester – Annexure-XI

4. The proposed syllabus for the course titled "Advanced Operating Systems" offered to the ECE branch in the I year I Semester – Annexure-XII

5. The proposed syllabus for the course titled "Parallel Processing" offered to the ECE branch in the I year I Semester – Annexure-XIII

6. The proposed syllabus for the course titled "CPLD and FPGA Architectures & Applications" offered to the ECE branch in the I year I Semester – Annexure-XIV

7. The proposed syllabus for the course titled "Electronic Design Automation Tools " offered to the ECE branch in the I year I Semester – Annexure-XV

8. The proposed syllabus for the course titled "Digital System Design " offered to the ECE branch in the I year I Semester – Annexure-XVI

9. The proposed syllabus for the course titled "Analog and Digital CMOS VLSI Design Lab " offered to the ECE branch in the I year I Semester – Annexure-XVII

10. The proposed syllabus for the course titled "Embedded systems Design Lab " offered to the ECE branch in the I year I Semester – Annexure-XVIII

11. The proposed syllabus for the course titled "RTL Design & Verification using System Verilog" offered to the ECE branch in the I year II Semester – Annexure-XIX

12. The proposed syllabus for the course titled "Internet of Things and its applications " offered to the ECE branch in the I year II Semester – Annexure-XX

HEAD
DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING
G V P COLLEGE OF ENGINEERING FOR WOMEN

13. The proposed syllabus for the course titled "Low power VLSI Design " offered to the ECE branch in the I year II Semester – Annexure-XXI

14. The proposed syllabus for the course titled "System on Chip Design " offered to the ECE branch in the I year II Semester – Annexure-XXII

15. The proposed syllabus for the course titled "Digital signal and Image Processing " offered to the ECE branch in the I year II Semester – Annexure-XXIII

16. The proposed syllabus for the course titled "Communication Buses and Interfaces "offered to the ECE branch in the I year II Semester – Annexure-XXIV

17. The proposed syllabus for the course titled "Design for Testability "offered to the ECE branch in the I year II Semester – Annexure-XXV.

18. The proposed syllabus for the course titled "DSP Processors and Architectures "offered to the ECE branch in the I year II Semester – Annexure-XXVI

19.The proposed syllabus for the course titled "RTL Design & Verification using System Verilog lab " offered to the ECE branch in the I year II Semester – Annexure-XXVII.

20. The proposed syllabus for the course titled "Internet of Things and its applications lab offered to the ECE branch in the I year II Semester – Annexure-XXVIII

21. The proposed syllabus for the course titled "Mini project with seminar " offered to the ECE branch in the I year II Semester – Annexure-XXIX

Resolution No: GVPCEW(A)/BOS/ECE/2024/3

The Board Members unanimously authorize the Chairperson to make minor modifications in the title/content of a course if necessary.

The meeting concluded by thanking all the members.

Members Present:

Name of the Member	Designation	Signature
Dr.P.M.K.Prasad	Chairperson, BoS and Head, Dept of ECE	
Dr.L.Ganesh	Associate Professor	
Dr.B.Vijayalakshmi	Associate Professor	
Dr.D.V.A.N.Ravikumar	Associate Professor	
Ms.Ch.Sirisha	Assistant Professor	
Dr.M.Manikumari	Assistant Professor	
Mr.N.V.Maheswara Rao	Assistant Professor	
Ms.B.Lakshmi	Assistant Professor	
Ms.L.Sarika	Assistant Professor	
Mr.R.Sunil Kumar	Assistant Professor	
Mr.PVK Chaitanya	Assistant Professor	
Ms.N.Roopavathi	Assistant Professor	
Ms.B.Divyasathi	Assistant Professor	
Dr.P.V.Dileep Bhumireddi	Assistant Professor	

HEAD
DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING

Ms.B.V.R.Gowri	Assistant Professor	
Dr. Tapan Kumar Gandhi	Subject Expert	
Prof.Venkata Mani V.	Subject Expert	
Prof.P.Rajesh Kumar	Vice Chancellor's Nominee	
Sri A.Venkata Krishna	Industry Representative	
Ms.Krishna Deepika Chittela	College Alumni	
Sri Amal Raj Pukkella	Expert for Special Courses	

Chairperson, BoS

HEAD
DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING
G V P COLLEGE OF ENGINEERING FOR W
MADHURAWADA, VISAKHAPATNAM -- 5

Ms.B.V.R.Gowri	Assistant Professor	
Prof.Tapan Kumar Gandhi	Subject Expert	
Prof.Venkata Mani V.	Subject Expert	
Prof.P.Rajesh Kumar	Vice Chancellor's Nominee	
Sri A.Venkata Krishna	Industry Representative	
Ms.Krishna Deepika Chittela	College Alumni	
Sri Amal Raj Pukkella	Expert for Special Courses	

Chairperson , BoS

HEAD
DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING
G V P COLLEGE OF ENGINEERIING FOR WO
MADHURAWADA, VISAKHAPATNAM – 5

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous)
Madhurawada :: Visakhapatnam – 530048
(Approved by AICTE, New Delhi and Affiliated to Andhra University, Visakhapatnam)
(Accredited by NBA for B.Tech-CSE, ECE, IT and EEE)
(Accredited by NAAC with A Grade from 2022-2023 to 2027-2028)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (AI &ML)

Date: 29 /03/2025

Minutes of 2nd meeting of the Board of Studies in Computer Science and Engineering (AI&ML) Department held on 28th & 29th March 2025 (Friday & Saturday) from 10:00AM to 04:00PM in hybrid mode

The meeting of the Board of Studies in the Department of Computer Science and Engineering (AI&ML), Gayatri Vidya Parishad College of Engineering for Women (Autonomous) is held on 28th & 29th March 2025 (Friday & Saturday) to finalize the course structure and syllabi of the 2nd, 3rd & 4th year (1st semester and 2nd semester) courses of all B. Tech Program offered by the Department under the regulations R – 24 from the academic year 2024-25 onwards.

Member not present:

Mr. Rajesh Srinivasan	Vice President, CGI India	Expert for Special Courses

Members Present:

Person in Chair: Dr. D. K. Bebarta, HoD-CSE (AI&ML)

External BoS Members:

Prof. S Viziananda Row, Professor, Computer Science and Systems Engineering, Andhra University, Visakhapatnam	Vice Chancellor's Nominee	Offline
Dr. Debi Prosad Dogra, Asso. Professor, IIT Bhubaneswar	Subject Expert	Online
Dr. Anjali Mahapatra, Asst. Professor, IIIT, Bhubaneswar	Subject Expert	Online and Offline
Dr M Subrahmanya Sarma, Vice President, Accenture	Industry Representative	Online
Mrs. Vivekitha Sagi, Lead Quality Engineer, Persistent Systems	College Alumni	Offline

Internal BoS Members:

Dr. M R K Krishna Rao, Professor	BoS Member	Online and Offline
Dr. K Purushotam Naidu, Assistant Professor	BoS Member	Offline
Mrs. D. B. Santhoshi Assistant Professor	BoS Member	Offline

Head of Department
Dept. of Computer Science
GVP College of Engineering for Women

Mrs. H Gouthami Assistant Professor	BoS Member	Offline
Mr. P Siva Assistant Professor	BoS Member	Offline
Mrs. Sujatha Mudadla Assistant Professor	BoS Member	Offline

The meeting commenced with the Principal & Chairman, Academic Council, welcoming the members of Board of Studies of different departments and requested to frame the syllabus in accordance with the guidelines of NEP-2020 and the industry standards.

Following this, the Principal informed the members about the amendment made to the Academic Rules and Regulations (R-24) for B. Tech Programs in accordance with AICTE recommendations during the Academic Council meeting held on 26.10.2024.

The amendment pertains to the B. Tech Program regulations at GVPCEW(A), effective from the 2024-25 admitted batch. As per Section 17 (A-ii) of the Academic Rules & Regulations (R-24), the previous requirement for earning a B. Tech Degree with a Minor was to complete 12 credits within the 160-credit framework of the B. Tech program. This condition has now been revised, requiring students to earn 12 additional credits beyond the 160-credit requirement.

The Board of Studies (BoS) meeting of the Department of Computer Science and Engineering (AI&ML) commenced with a welcome note from the Chairperson, who also outlined the key resolutions made in the earlier BoS meeting held on 3rd August 2024, which finalized the course structure and syllabi of the 1st year. The Chairperson further requested the Board to deliberate on the course structure and syllabi for the 2nd, 3rd, and 4th years and approve the proposed modifications.

After a detailed and constructive discussion on the revised syllabus for the B. Tech program under R-24 regulations, the Board collectively agreed to implement the proposed courses in B. Tech program, CSE (AI&ML).

The Board unanimously resolved the following:

Item-1: Presentation of B. Tech - CSE (AI&ML) Course Structure

The Chairman has presented the Course Structure of the B. Tech. – CSE (AI&ML) program to the board members for **review, discussion, and approval as per R-24 regulations.**

Resolution No: GVPCEW(A)/BOS-2/CSM/2025/1

It has been resolved to recommend to the Academic Council for approval that the **Course Structure**, as outlined in **Annexure-I with highlighting key revisions and updates** be implemented for the **B. Tech - CSE (AI&ML) Program** effective from **2024-2025 admitted batch onwards**.

Item-2: Presentation of syllabus of core courses in II, III & IV B. Tech - CSE (AI&ML) Program

The Chairman has presented the syllabus of **Program Core (PC), Engineering Sciences (ES) and Skill Courses (SC)** of the **II, III & IV B. Tech - CSE (AI&ML) program** to the board members for **discussion, and approval in accordance with the R-24 regulations.**

Resolution No: GVPCEW(A)/BOS-2/CSM/2025/2

It is resolved to recommend to the Academic Council that the following courses offered for B. Tech - CSE (AI&ML) Program effective from **2024-2025 admitted batch onwards** for approval.

1. The proposed syllabus for the course titled "Data Structures" offered to the **B. Tech - CSE (AI&ML)** branch in the II year I Semester – Annexure-II.
2. The proposed syllabus for the course titled "Object Oriented Programming through Java" offered to the **B. Tech - CSE (AI&ML)** branch in the II year I Semester – Annexure-III.
3. The proposed syllabus for the course titled "Database Management Systems" offered to the **B. Tech - CSE (AI&ML)** branch in the II year I Semester – Annexure-IV.
4. The proposed syllabus for the lab course titled "Data Structures Lab" offered to the **B. Tech - CSE (AI&ML)** branch in the II year I Semester – Annexure- V.
5. The proposed syllabus for the lab course titled "Object Oriented Programming through Java Lab" offered to the **B. Tech - CSE (AI&ML)** branch in the II year I Semester – Annexure-VI.
6. The proposed syllabus for the lab course titled "Database Management Systems Lab" offered to the **B. Tech - CSE (AI&ML)** branch in the II year I Semester – Annexure-VII.
7. The proposed syllabus for the course titled "Skill Development Course-I: (Continuous Integration and Continuous Delivery using DevOps)" offered to the **B. Tech - CSE (AI&ML)** branch in the II year I Semester – Annexure- VIII.
8. The proposed syllabus for the course titled "Computer Organization" offered to the **B. Tech - CSE (AI&ML)** branch in the II year II Semester – Annexure-IX.
9. The proposed syllabus for the course titled "Design and Analysis of Algorithms" offered to the **B. Tech - CSE (AI&ML)** branch in the II year II Semester – Annexure-X.
10. The proposed syllabus for the course titled "Data Warehousing and Data Mining" offered to the **B. Tech - CSE (AI&ML)** branch in the II year II Semester – Annexure-XI.
11. The proposed syllabus for the course titled "Artificial Intelligence" offered to the **B. Tech - CSE (AI&ML)** branch in the II year II Semester – Annexure-XII.
12. The proposed syllabus for the lab course titled "Algorithms Lab through C+" offered to the **B. Tech - CSE (AI&ML)** branch in the II year II Semester – Annexure-XIII.
13. The proposed syllabus for the lab course titled "Data Mining Lab using Python" offered to the **B. Tech - CSE (AI&ML)** branch in the II year II Semester – Annexure-XIV.
14. The proposed syllabus for the skill course titled "Skill Development Course-II: MERN Stack Development" offered to the **B. Tech - CSE (AI&ML)** branch in the II year II Semester – Annexure-XV.
15. The proposed syllabus for the course titled "Formal Language and Automata Theory" offered to the **B. Tech - CSE (AI&ML)** branch in the III year I Semester – Annexure-XVI.
16. The proposed syllabus for the course titled "Operating Systems" offered to the **B. Tech - CSE (AI&ML)** branch in the III year I Semester – Annexure-XVII.
17. The proposed syllabus for the course titled "Machine Learning" offered to the **B. Tech - CSE (AI&ML)** branch in the III year I Semester – Annexure-XVIII.
18. The proposed syllabus for the lab course titled "Operating Systems Lab" offered to the **B. Tech - CSE (AI&ML)** branch in the III year I Semester – Annexure-XIX.
19. The proposed syllabus for the lab course titled "Machine Learning Lab" offered to the **B. Tech - CSE (AI&ML)** branch in the III year I Semester – Annexure-XX.
20. The proposed syllabus for the course titled "Computer Networks" offered to the **B. Tech - CSE (AI&ML)** branch in the III year II Semester – Annexure-XXI.
21. The proposed syllabus for the course titled "Big Data Analytics" offered to the **B. Tech - CSE (AI&ML)** branch in the III year II Semester – Annexure-XXII.

Head of Department

22. The proposed syllabus for the course titled "Deep Learning Techniques" offered to the **B. Tech - CSE (AI&ML)** branch in the III year II Semester – Annexure-XXIII.
23. The proposed syllabus for the lab course titled "Computer Networks Lab" offered to the **B. Tech - CSE (AI&ML)** branch in the III year II Semester – Annexure-XXIV.
24. The proposed syllabus for the lab course titled "Big Data Analytics Lab" offered to the **B. Tech - CSE (AI&ML)** branch in the III year II Semester – Annexure-XXV.
25. The proposed syllabus for the lab course titled "Deep Learning Techniques Lab" offered to the **B. Tech - CSE (AI&ML)** branch in the III year II Semester – Annexure-XXVI
26. The proposed syllabus for the skill course titled "Skill Development Course-IV: MLOps with Cloud Platform" offered to the **B. Tech - CSE (AI&ML)** branch in the III year II Semester – Annexure-XXVII.
27. The proposed syllabus for the skill course titled "Skill Development Course-V: Generative AI and Prompt Engineering" offered to the **B. Tech - CSE (AI&ML)** branch in the IV year I Semester – Annexure-XXVIII.

Item-3: Approval of syllabus of Professional Elective courses for B. Tech - CSE (AI&ML) Program.

The Chairman has presented the syllabus of **Professional Elective courses for B. Tech - CSE (AI&ML) program** to the board members for **discussion, and approval in accordance with the R-24 regulations.**

Resolution No: GVPCEW(A)/BOS-2/CSM/2025/3

1. The proposed syllabus for the course titled "API and Micro Services" offered to the **B. Tech - CSE (AI&ML)** branch- Annexure-XXIX.
2. The proposed syllabus for the course titled "Ethical Hacking" offered to the **B. Tech - CSE (AI&ML)** branch- Annexure-XXX.
3. The proposed syllabus for the course titled "Generative AI Models" offered to the **B. Tech - CSE (AI&ML)** branch- Annexure-XXXI.
4. The proposed syllabus for the course titled "Mobile App Development" offered to the **B. Tech - CSE (AI&ML)** branch- Annexure-XXXII.
5. The proposed syllabus for the course titled "Soft Computing" offered to the **B. Tech - CSE (AI&ML)** branch- Annexure-XXXIII.
6. The proposed syllabus for the course titled "Computer Vision" offered to the **B. Tech - CSE (AI&ML)** branch- Annexure-XXXIV.
7. The proposed syllabus for the course titled "Cybersecurity and Digital Forensics" offered to the **B. Tech - CSE (AI&ML)** branch- Annexure-XXXV.
8. The proposed syllabus for the course titled "Fog and Edge Computing" offered to the **B. Tech - CSE (AI&ML)** branch- Annexure-XXXVI.
9. The proposed syllabus for the course titled "NoSQL Databases" offered to the **B. Tech - CSE (AI&ML)** branch- Annexure-XXXVII.
10. The proposed syllabus for the course titled "Data Science" offered to the **B. Tech - CSE (AI&ML)** branch- Annexure-XXXVIII.
11. The proposed syllabus for the course titled "Principles of Compiler Design" offered to the **B. Tech - CSE (AI&ML)** branch- Annexure-XXXIX.
12. The proposed syllabus for the course titled "Natural Language Processing" offered to the **B. Tech - CSE (AI&ML)** branch- Annexure-XL.
13. The proposed syllabus for the course titled "AI Chatbots" offered to the **B. Tech - CSE (AI&ML)** branch- Annexure-XLI.

Head of Department

14. The proposed syllabus for the course titled "Modern Cryptography & Network Security" offered to the **B. Tech - CSE (AI&ML)** branch- Annexure-XLII.
15. The proposed syllabus for the course titled "Reinforcement Learning" offered to the **B. Tech - CSE (AI&ML)** branch- Annexure-XLIII.
16. The proposed syllabus for the course titled "Software Engineering" offered to the **B. Tech - CSE (AI&ML)** branch- Annexure-XLIV.

Item-4: Approval of syllabus of Open Elective courses offered by CSE (AI&ML) department to other branches.

Resolution No: GVPCEW(A)/BOS-2/CSM/2025/4

1. The proposed syllabus for the course titled "Introduction to AI Chatbots" offered as Open Elective to other branches – Annexure-XLV.
2. The proposed syllabus for the course titled "Natural Language Processing and Applications" offered as Open Elective to other branches – Annexure- XLVI.
3. The proposed syllabus for the course titled "Python for Data Science" offered as Open Elective to other branches – Annexure-XLVII

Item-5: Approval of syllabus of minor courses offered by CSE (AI&ML) department to other branches.

Resolution No: GVPCEW(A)/BOS-2/CSM/2025/5

1. The proposed syllabus for the course titled "Artificial Intelligence and Machine Learning" offered as Minor Course to other branches – Annexure-XLVIII.
2. The proposed syllabus for the course titled "Fundamentals of Business Analytics" offered as Minor Course to other branches – Annexure-XLIX.
3. The proposed syllabus for the course titled "Introduction to Deep Learning" offered as Minor Course to other branches – Annexure-L.
4. The proposed syllabus for the course titled "Reinforcement Learning Techniques" offered as Minor Course to other branches – Annexure-LI

Item-6: Approval of syllabus of Honours courses for B. Tech - CSE (AI&ML) Program.

Resolution No: GVPCEW(A)/BOS-2/CSM/2025/6

1. The proposed syllabus for the course titled "Quantum Computing" offered as Honour's Course to the **B. Tech - CSE (AI&ML)** branch – Annexure-LII.
2. The proposed syllabus for the course titled "Social Media Analysis" offered as Honour's Course to the **B. Tech - CSE (AI&ML)** branch – Annexure-LIII.
3. The proposed syllabus for the course titled "High Performance Computing" offered as Honour's Course to the **B. Tech - CSE (AI&ML)** branch – Annexure-LIV.
4. The proposed syllabus for the course titled "Business Analytics" offered as Honour's Course to the **B. Tech - CSE (AI&ML)** branch – Annexure-LV.
5. The proposed syllabus for the course titled "Data Visualization" offered as Honour's Course to the **B. Tech - CSE (AI&ML)** branch – Annexure-LVI.

Item-7: Approval of syllabus of other courses offered by CSE (AI&ML) department to other branches.

Resolution No: GVPCEW(A)/BOS-2/CSM/2025/7

1. The proposed syllabus for the course titled "Machine Learning using Python" offered as Skill Course to the B. Tech – EEE branch in IV-I– Annexure-LVII.

Head of Department

Item-8: Any other matter

The Board Members unanimously authorize the Chairperson to make minor modifications in the title/content of a course if necessary.

The meeting is concluded by thanking all the members.

Members Present:

BoS Member's Name	Designation	Signature
Dr. D. K. Bebarta, HoD-CSE (AI&ML)	Chairman	
Dr. M R K Krishna Rao, Professor	BoS Member	
Dr. K Purushotam Naidu, Assistant Professor	BoS Member	
Mrs. D. B. Santhoshi Assistant Professor	BoS Member	
Mrs. H Gouthami Assistant Professor	BoS Member	
Mr. P Siva Assistant Professor	BoS Member	
Mrs. Sujatha Mudadla Assistant Professor	BoS Member	
Prof. S Vizianananda Row, Professor, Computer Science and Systems Engineering, Andhra University, Visakhapatnam	Vice Chancellor's Nominee	
Dr. Debi Prosad Dogra, Asso. Professor, IIT Bhubaneswar	Subject Expert	
Dr. Anjali Mahapatra, Asst. Professor, IIIT, Bhubaneswar	Subject Expert	
Dr M Subrahmanya Sarma, Vice President, Accenture	Industry Representative	
Mr. Rajesh Srinivasan, Vice President, CGI India	Expert for Special Courses	
Mrs. Vivekitha Sagi, Lead Quality Engineer, Persistent Systems	College Alumni	

Dr. Dwiti Krishna Bebarta
HoD-CSE (AI&ML)
Head of Department
Dept. of Computer Science & Engineering (AIML)
GVP College of Engineering for Women
Madhurawada, Visakhapatnam-48

The Board Members unanimously authorize the Chairperson to make minor modifications in the title/ contents of a course if necessary.

The meeting is concluded by thanking all the members.

Members Present:

BoS Member's Name	Designation	Signature
Dr. D. K. Behera, (HoD-CSE (AI&ML))	Chairman	
Dr. M S K Krishna Rao, Professor	BoS Member	
Dr. K Purushotam Naidu, Assistant Professor	BoS Member	
Mrs. D. H Santhoshi, Assistant Professor	BoS Member	
Mrs. H Goutham, Assistant Professor	BoS Member	
Mr. P Siva, Assistant Professor	BoS Member	
Mrs. Sujatha Mudadla, Assistant Professor	BoS Member	
Prof. S Viswapathi Raju, Professor, Computer Science and Systems Engineering, Andhra University, Visakhapatnam	Vice Chancellor's Nominee	
Dr. Delli Prasad Dogra, Asso. Professor, IIT Bhubaneswar	Subject Expert	
Dr. Anjali Mahapatra, Asst. Professor, IIIT, Bhubaneswar	Subject Expert	
Dr M Subrahmanya Sarma, Vice President, Accenture	Industry Representative	
Mr. Rajesh Srinivasan, Vice President, CGI India	Expert for Special Courses	
Mrs. Vivekisha Sagi, Lead Quality Engineer, Persistent Systems	College Alumni	

Dr. Delli Krishna Behera
HoD-CSE (AI&ML)

Item.8: Any other matter

The Board Members unanimously authorize the Chairperson to make minor modifications in the title/contents of a course if necessary.

The meeting is concluded by thanking all the members.

Members Present

BoS Member's Name	Designation	Signature
Dr. D. K. Behera, HoD-CSE (AI&ML)	Chairman	
Dr. M R K Krishna Rao, Professor	BoS Member	
Dr. K. Purushotam Naidu, Assistant Professor	BoS Member	
Mrs. D. B. Santhoshi, Assistant Professor	BoS Member	
Mrs. B Goutham, Assistant Professor	BoS Member	
Mr. P Siva, Assistant Professor	BoS Member	
Mrs. Sujatha Mudadla, Assistant Professor	BoS Member	
Prof. S Viswananda Rao, Professor, Computer Science and Systems Engineering, Andhra University, Visakhapatnam	Vice Chancellor's Nominee	
Dr. Debi Prosad Dogra, Asso. Professor, IIT Bhubaneswar	Subject Expert	
Dr. Anjan Mahapatra, Asst. Professor, IIIT, Bhubaneswar	Subject Expert	
Dr M Subrahmanya Sarma, Vice President, Accenture	Industry Representative	
Mr. Rajesh Srinivasan, Vice President, CGI India	Expert for Special Courses	
Mrs. Vivekitha Sagi, Lead Quality Engineer, Persistent Systems	College Alumni	

Dr. Dharani Krishna Behera
HoD-CSE (AI&ML)

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous)

(Approved by AICTE, New Delhi and Permanently Affiliated to Andhra University, Visakhapatnam)
Madhurawada :: Visakhapatnam – 530 048

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Minutes of 2nd meeting of the Board of Studies in Electrical and Electronics Engineering Department held on 10th & 11th April 2025 (Thursday & Friday) from 10:00AM to 04:00PM in hybrid mode

The meeting of the Board of Studies in Electrical and Electronics Engineering Department of Gayatri Vidya Parishad College of Engineering for Women is held on 10th & 11th April 2025 (Thursday & Friday) from 10:00AM to 04:00PM to finalize the course structure and syllabi of the 2nd, 3rd & 4th year (1st semester and 2nd semester) courses of B. Tech Program under the regulations R – 24 from the academic year 2024-25 onwards.

Members Present:

Dr R V S Lakshmi Kumari - Chairperson

External Members:

1	Dr K Srikumar, Professor, Dept of EEE JNTU-GV, Vizianagaram	Subject Expert	Offline
2	Dr A Hemachander, Assistant Professor, Dept of EEE NIT-Puducherry, Puducherry	Subject Expert	Offline
3	Dr P Mallikarjuna Rao, Professor & Head of the Dept of Electrical & Electronics Engineering, AU College of Engineering, Visakhapatnam	Vice Chancellor's Nominee	Offline
4	Dr M Santhosh Kumar, System Design Engineer Sensata Technologies, Pune	Industry Representative	Online
5	Ms Ch Vijayalakshmi, Junior Electrical Engineer ACUTRONIC India Pvt Ltd Hyderabad	College Alumni	Offline
6	Ms I Kavya, Associate Senior Electrical Engineer Burnsand Mc Donnells India Pvt Ltd Bangalore	Expert for Special Courses	Offline

Internal Members:

1	Dr ASV Vijaya Lakshmi	Assistant Professor	Offline
2	Dr M Krishna	Assistant Professor	Offline
3	Mrs V Sree Vidhya	Assistant Professor	Offline
4	Mr Y Ramu	Assistant Professor	Offline
5	Mr D Srinivas Reddy	Assistant Professor	Offline
6	Ms P Sai Jyothi	Assistant Professor	Offline
7	Mrs B Kusuma Kumari	Assistant Professor	Offline
8	Mr A Srinivasa Rao	Assistant Professor	Offline

The meeting commenced with the Principal & Chairman, Academic Council, welcoming the members of Board of Studies of different departments and requested to frame the syllabus in accordance with the guidelines of NEP-2020 and the industry standards.

Following this, the Principal informed the members about the amendment made to the Academic Rules and Regulations (R-24) for B.Tech Programs in accordance with AICTE recommendations during the Academic Council meeting held on 26.10.2024.

The amendment pertains to the B. Tech Program regulations at GVPCEW(A), effective from the 2024-25 admitted batch. As per Section 17 (A-ii) of the Academic Rules & Regulations (R-24), the previous requirement for earning a B.Tech Degree with a Minor was to complete 12 credits within the 160-credit framework of the B.Tech program. This condition has now been revised, requiring students to earn 12 additional credits beyond the 160-credit requirement.

The Board of Studies (BoS) meeting of the Department of Electrical and Electronics Engineering commenced with a welcome note from the Chairperson, who also outlined the key resolutions made in the earlier BoS meeting held on 3rd August 2024, which finalized the course structure and syllabi of the 1st year. The Chairperson further requested the Board to deliberate on the course structure and syllabi for the 2nd, 3rd, and 4th years and approve the proposed modifications.

After a detailed and constructive discussion on the revised syllabus for the B.Tech program under R-24 regulations, the Board collectively agreed to implement the proposed courses across various B.Tech program.

The Board unanimously resolved the following:

Item-1: B.Tech EEE Course Structure

Resolution No: GVPCEW(A)/BOS-2/EEE/2025/1

It has been resolved to recommend to the Academic Council for approval of 2nd, 3rd & 4th year B.Tech EEE program as outlined in Annexure-I. The courses are to be offered for B.Tech Program from the 2024 admitted batch onwards.

Item-2: Approval of syllabus of II, III & IV B.Tech EEE Program

Resolution No: GVPCEW(A)/BOS-2/EEE/2025/2

It is resolved to recommend to the Academic Council that the following courses offered for B.Tech EEE Program to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Electrical Circuits 2" offered to the EEE branch in the II year I Semester – Annexure-II
2. The proposed syllabus for the course titled "Electrical Machines 1" offered to the EEE branch in the II year I Semester – Annexure-III
3. The proposed syllabus for the course titled "Electrical Circuits Lab" offered to the EEE branch in the II year I Semester – Annexure-IV
4. The proposed syllabus for the course titled "Design of Electrical Circuits Using Engineering Software" offered to the EEE branch in the II year I Semester – Annexure-V
5. The proposed syllabus for the course titled "Electrical Machines 2" offered to the EEE branch in the II year II Semester – Annexure-VI
6. The proposed syllabus for the course titled "Electrical Measurements" offered to the EEE branch in the II year II Semester – Annexure-VII
7. The proposed syllabus for the course titled "EMF Theory" offered to the EEE branch in the II year II Semester – Annexure-VIII
8. The proposed syllabus for the course titled "Power Systems 1" offered to the EEE branch in the II year II Semester – Annexure-IX
9. The proposed syllabus for the course titled "Electrical Machines 1 Lab" offered to the EEE branch in the II year II Semester – Annexure-X
10. The proposed syllabus for the course titled "Electrical Measurements Lab" offered to the EEE branch in the II year II Semester – Annexure-XI
11. The proposed syllabus for the course titled "Electrical CAD" offered to the EEE branch in the II year II Semester – Annexure-XII
12. The proposed syllabus for the course titled "Control Systems" offered to the EEE branch in the III year I Semester – Annexure-XIII
13. The proposed syllabus for the course titled "Power Electronics" offered to the EEE branch in the III year I Semester – Annexure-XIV
14. The proposed syllabus for the course titled "Power systems 2" offered to the EEE branch in the III year I Semester – Annexure-XV
15. The proposed syllabus for the course titled "Control Systems Lab" offered to the EEE branch in the III year I Semester – Annexure-XVI
16. The proposed syllabus for the course titled "Electrical Machines 2 Lab" offered to the EEE branch in the III year I Semester – Annexure-XVII
17. The proposed syllabus for the course titled "Electric Drives" offered to the EEE branch in the III year II Semester – Annexure-XVIII

18. The proposed syllabus for the course titled "Power System Analysis and Stability" offered to the EEE branch in the III year II Semester – Annexure-XIX
19. The proposed syllabus for the course titled "Power Electronics Lab" offered to the EEE branch in the III year II Semester – Annexure-XX
20. The proposed syllabus for the course titled "Power Systems Simulation Lab" offered to the EEE branch in the III year II Semester – Annexure-XXI
21. The proposed syllabus for the course titled "Fundamentals of PLC Programming" offered to the EEE branch in the III year II Semester – Annexure-XXII
22. The proposed syllabus for the course titled "IOT and its Applications" offered to the EEE branch in the IV year I Semester – Annexure-XXIII

Item-3: Approval of syllabus of Professional Elective courses

Resolution No: GVPCEW(A)/BOS-2/EEE/2025/3

It is resolved to recommend to the Academic Council that the following Program Elective courses offered for B.Tech EEE Program to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Artificial Intelligence Applications in Power Systems" offered to the EEE branch students – Annexure-XXIV
2. The proposed syllabus for the course titled "Digital Control Systems" offered to the EEE branch students – Annexure- XXV
3. The proposed syllabus for the course titled "Electrical Distribution Systems" offered to the EEE branch students – Annexure- XXVI
4. The proposed syllabus for the course titled "Electrical Energy Audit and Management" offered to the EEE branch students – Annexure- XXVII
5. The proposed syllabus for the course titled "Flexible AC Transmission Systems" offered to the EEE branch students – Annexure- XXVIII
6. The proposed syllabus for the course titled "HVDC Transmission" offered to the EEE branch students – Annexure- XXIX.
7. The proposed syllabus for the course titled "Hybrid Electric Vehicles" offered to the EEE branch students – Annexure-XXX
8. The proposed syllabus for the course titled "Machine Learning Applications in Electrical Engineering" offered to the EEE branch students – Annexure- XXXI
9. The proposed syllabus for the course titled "Power System Operation and Control" offered to the EEE branch students – Annexure- XXXII
10. The proposed syllabus for the course titled "Power System Protection" offered to the EEE branch students – Annexure- XXXIII
11. The proposed syllabus for the course titled "Renewable Energy Sources" offered to the EEE branch students – Annexure- XXXIV

12. The proposed syllabus for the course titled "Smart Grids" offered to the ECE branch in the II year I Semester – Annexure- XXXV
13. The proposed syllabus for the course titled "Special Electrical Machines" offered to the EEE branch students – Annexure-XXXVI
14. The proposed syllabus for the course titled "Utilization of Electrical Energy" offered to the EEE branch students – Annexure-XXXVII

Item-4: Approval of syllabus of Open Elective courses to Other Departments offered by EEE

Resolution No: GVPCEW(A)/BOS-2/EEE/2024/4

It is resolved to recommend to the Academic Council that the following Open Elective courses and other department courses offered by EEE Program to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Basics of Electrical Wiring" offered as open elective by the Department of EEE to other Departments – Annexure- XXXVIII
2. The proposed syllabus for the course titled "Fundamentals of Power Electronics" offered as open elective by the Department of EEE to other Departments – Annexure- XXXIX
3. The proposed syllabus for the course titled "Fundamentals of Utilization Of Electrical Energy" offered as open elective by the Department of EEE to other Departments – Annexure- XL
4. The proposed syllabus for the course titled "Linear Control Systems" offered as open elective by the Department of EEE to other Departments – Annexure- XLI
5. The proposed syllabus for the course titled "Sustainable Energy Sources" offered as open elective by the Department of EEE to other Departments – Annexure- XLII

Item-5: Approval of the subjects & syllabus related to Minor program in EEE

Resolution No: GVPCEW(A)/BOS-2/EEE/2025/5

It is resolved to recommend to the Academic Council that the following courses offered for Minor Program in EEE to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Basics of Smart Grids" offered as Minor course in EEE – Annexure- XLIII
2. The proposed syllabus for the course titled "Concepts of Power System Engineering" offered as Minor course in EEE – Annexure- XLIV
3. The proposed syllabus for the course titled "Electrical Vehicle Technology" offered as Minor course in EEE – Annexure- XLV
4. The proposed syllabus for the course titled "Energy Conservation, Audit and Management" offered as Minor course in EEE – Annexure- XLVI

Item-6: Approval of the subjects & syllabus related to Honors program in EEE

Resolution No: GVPCEW(A)/BOS-2/EEE/2025/6

It is resolved to recommend to the Academic Council that the following courses offered for Honors Program in EEE to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Electrical Vehicle Motor Drives" offered as Honors course in EEE – Annexure- XLVII
2. The proposed syllabus for the course titled "Energy Management Strategies and Communication Protocols for EV/HEV" offered as Honors course in EEE – Annexure- XLVIII
3. The proposed syllabus for the course titled "Energy Storage Systems" offered as Honors course in EEE – Annexure- XLIX
4. The proposed syllabus for the course titled "EV Charging Technologies" offered as Honors course in EEE – Annexure- L
5. The proposed syllabus for the course titled "Switched Mode Power Conversion" offered as Honors course in EEE – Annexure- LI
6. The proposed syllabus for the course titled "Evolutionary Algorithms Applications in Power Engineering" offered as Honors course in EEE – Annexure- LII
7. The proposed syllabus for the course titled "Power Converters for Microgrid" offered as Honors course in EEE – Annexure- LIII
8. The proposed syllabus for the course titled "Power Quality" offered as Honors course in EEE – Annexure- LIV
9. The proposed syllabus for the course titled "Power Systems Reliability" offered as Honors course in EEE – Annexure- LV
10. The proposed syllabus for the course titled "Restructured Power Systems" offered as Honors course in EEE – Annexure- LVI

Item-7: Approval of syllabus of Mandatory course

Resolution No: GVPCEW(A)/BOS-2/EEE/2025/7

It is resolved to recommend to the Academic Council that the following course offered for B.Tech Program in EEE to be effective from 2024 admitted batch onwards for approval.

1. The proposed syllabus for the course titled "Design Thinking & Innovation" offered as Mandatory course in EEE – Annexure- LVII

Resolution No: GVPCEW(A)/BOS-2/EEE/2025/8

The Board Members unanimously authorize the Chairperson to make minor modifications in the title/content of a course if necessary.

The meeting concluded by thanking all the members.

Members Present:

Name of the Member	Designation	Signature
Dr R V S Lakshmi Kumari	Chairperson, BoS and Head, Dept of EEE	
Dr ASV Vijaya Lakshmi	Assistant Professor	
Dr M Krishna	Assistant Professor	
Mrs V Sree Vidhya	Assistant Professor	
Mr Y Ramu	Assistant Professor	
Mr D Srinivas Reddy	Assistant Professor	
Ms P Sai Jyothi	Assistant Professor	
Mrs B Kusuma Kumari	Assistant Professor	
Mr A Srinivasa Rao	Assistant Professor	
Dr K Srikumar	Subject Expert	
Dr A Hemachander	Subject Expert	
Dr P Mallikarjuna Rao	Vice Chancellor's Nominee	
Dr M Santhosh Kumar	Industry Representative	
Ms Ch Vijayalakshmi	College Alumni	
Ms I Kavya	Expert for Special Courses	

Chairperson, BoS

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ANNEXURE – LXII

M.Tech -VLSI DESIGN & EMBEDDED SYSTEMS

Course Structure and Scheme of Valuation w.e.f. 2024-25 admitted batch

III SEMESTER

Code	Name of the subject	Periods/week		Max. Marks		Total	Credits
		Theory	Lab	Ext.	Int.		
	Elective-V	3	-	70	30	100	3
	Open Elective	3	-	70	30	100	3
24EC21PR02	Dissertation-I/ Industrial Project	-	-	-	100	100	10
	Total	**6**	**-**	**140**	**160**	**300**	**16**

Elective V: Memory Technologies/ Programming Languages for Embedded Software/ Universal Verification Methodologies

Open Elective: Business Analytics/ Cost Management of Engineering Projects/ Optimization Techniques

IV SEMESTER

Code	Name of the subject	Periods/week		Max. Marks		Total	Credits
		Theory	Lab	Ext.	Int.		
24EC21PR03	Dissertation-II	-	-	100	-	100	16
	Total	**-**	**-**	**100**	**-**	**100**	**16**

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ANNEXURE – LXIII

Elective V
MEMORY TECHNOLOGIES
II Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

COURSE CODE: 24EC21PE5A

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Understand the basic structure, working, and types of SRAM used in digital systems.
CO2:	Explain the design, operation, and reliability aspects of Dynamic RAM (DRAM) technologies.
CO3:	Identify key non-volatile memories and their storage techniques.
CO4:	Outline memory reliability issues and radiation effects with protection methods.
CO5:	Summarize features and functions of FRAM, MRAM, and analog memories.

UNIT-I
Static RAM Technologies: Static Random-Access Memories (SRAMs), SRAM Cell Structures, MOSSRAM Architecture, MOS SRAM Cell and Peripheral Circuit, Bipolar SRAM, Advanced SRAM Architectures, Application Specific SRAMs.

UNIT-II
Dynamic RAM Technologies: DRAMs, MOSDRAM Cell, Bi-CMOSDRAM, Error Failures in DRAM, Advanced DRAM Design and Architecture, Application Specific DRAMs. SRAM and DRAM Memory controllers.

UNIT-III
Non-Volatile Memories: Masked ROMs, PROMs, Bipolar &CMOS PROM, EEPROMs, Floating Gate EPROM Cell, OTP EPROM, EEPROMs, Non-volatile SRAM, Flash Memories.

UNIT-IV
Memory Reliability and Radiation Effects: General Reliability issues, RAM Failure Modes and Mechanism, Nonvolatile Memory, Radiation Effects, SEP, Radiation Hardening Techniques. Process and Design issues, Radiation Hardened Memory Characteristics, Radiation Hardness Assurance and Testing.

UNIT-V
Advanced Memory Technologies: Introduction to memory technologies, High-density Memory Packing Technologies, Ferroelectric Random Access Memories (FRAMs), Gallium Arsenide (GaAs) FRAMs, Analog Memories, Magneto Resistive Random Access Memories (MRAMs), Experimental Memory Devices.

Text Books:
1. Advance Semiconductor Memories: "Architectures, Designs and Applications", Ashok K Sharma, Wiley, 2002.
Reference Books:
1. VLSI memory chip design, Kiyoo Itoh, Springer International Edition, 2001. 2. Semiconductor Memories: Technology, Testing and Reliability, Ashok K Sharma, PHI, 2002.

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ANNEXURE – LXIV

Elective V
PROGRAMMING LANGUAGES FOR EMBEDDED SOFTWARE
II Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

COURSE CODE: 24EC21PE5B

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Outline the use of embedded C and interfaces for controlling hardware in embedded systems.
CO2:	Compare Object-Oriented Programming with traditional programming methods.
CO3:	Explain dynamic memory use and code structuring with classes in C++.
CO4:	Identify operator overloading and inheritance types, and explain polymorphism in C++.
CO5:	Summarize templates and exception handling in C++ and basics of PERL scripting.

UNIT-I

Embedded Peripherals: Embedded 'C' Programming, Bitwise operations, Dynamic memory allocation, OS services, Linked stack and queue, Sparse matrices, Binary tree, Interrupt handling in C, Code Optimization issues, Writing LED drivers, Drivers for serial port communication, Embedded Software Development and Cycle and Methods (Waterfall, Agile).

UNIT-II

OOPs Programming techniques: Introduction to procedural, Modular, Object-Oriented and Generic Programming techniques, Limitations of procedural programming, Objects, Classes, Data members, Methods, Data Encapsulation, Data abstraction and information hiding, Inheritance, Polymorphism.

UNIT-III

Memory allocation techniques: CPP Programming: 'cin', 'cout', Formatting and I/O manipulators, New and delete Operators, Defining a class, Data members and methods, 'this' pointer, Constructors, Destructors, Friend
function, Dynamic memory allocation.

UNIT-IV

Overloading and Inheritance: Need of operator overloading, overloading the assignment, Overloading using friends, Type Conversions, single inheritance, base and derived classes, friend classes, types of Inheritance, hybrid inheritance, multiple inheritance, virtual base class, polymorphism, Virtual functions.

UNIT-V

Templates: Function template and class template, member function templates and template arguments, Multiple Exceptions, Scripting Languages, PERL: Operators, Statements Pattern Matching.

Text Books:

1. Embedded C, Pearson Education, Michael J. Pont, 2nd Edition, 2008.
2. Data structures via C++, Michael Berman, Oxford University Press, 2002.
3. Learning Perl, Randal L. Schwartz, O'Reilly Publications, 6th Edition 2011.

Reference Books:

1. Algorithms in C++, Robert Sedgewick, Addison Wesley Publishing Company,1999.
2. Operating System Concepts, Abraham Silberscatz, Peter B, Greg Gange, John Willey&Sons, 2005.

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ANNEXURE - LXV

Elective V
UNIVERSAL VERIFICATION METHODOLOGIES
II Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

COURSE CODE: 24EC21PE5C

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Understand the basic classes, Structure and Configurations of UVM
CO2:	Make use of UVM sequence items, Ports, Component communication for UVM Sequence generation and Arbitration
CO3:	Build UVM Stimulus using Driver components, Sequencer components, Monitor components and predictor components
CO4:	Develop UVM verification based on Score board components, Checker components
CO5:	Model UVM test suites, Call backs and environment deployment and integration

UNIT-I

Introduction to UVM: Verification challenges, Limitations of traditional verification methods, UVM architecture, Classes, UVM test bench structure and configuration, UVM components (environment, agent, driver, monitor, etc.), Connecting and coordinating UVM components

UNIT-II

UVM Transactions and Sequences: UVM Transaction Classes and Their Usage-Defining transaction data and their properties, Randomizing transaction data and constraints, Packing and unpacking transaction data.

UVM Sequence Items and Sequences- Sequence item classes and their usage, defining sequence logic and flow control, generating stimulus using sequences.

UVM Ports, Exports, and Component Communication-UVM ports, UVM exports and their usage, Connecting UVM components using ports and exports, UVM Sequence Generation and Arbitration

UNIT-III

UVM Stimulus Generation and Monitoring:

UVM Driver Components and Their Responsibilities- Interfacing with the design under test (DUT), Applying stimulus and monitoring responses, Coordinating with sequencers for stimulus generation, UVM Sequencer Components and Their Usage- Sequencer responsibilities and functionality, Handling complex monitoring scenarios, UVM Predictor Components and Their Usage.

UNIT-IV

UVM Verification Components and Mechanisms : UVM Scoreboard Components and Their Usage: Scoreboard structure and responsibilities, comparing actual and expected design behavior, Handling complex scoreboard scenarios

UVM Checker Components and Their Functionality**,**UVM Factory and Object Creation Mechanism- UVM factory structure and usage: Overriding component and object creation, Customizing UVM components using the factory. UVM Reporting, Logging, and Error Handling

UNIT-V

UVM Test Automation and Deployment : UVM Test and Test Suite Structure: Defining UVM test components and their responsibilities, Organizing and executing UVM test suites, Interpreting UVM test results and coverage. UVM Phasing Mechanism and Run-Time Hooks- UVM phasing structure and execution order, Synchronizing UVM components using phases, Utilizing run-time hooks for custom functionality, UVM Callbacks and User-Defined Components**,**
UVM Verification Planning, Regression, and Debug

Text Books:

1. UVM Primer: A Practical Guide to Using the Universal Verification Methodology by Janick Bergeron and Marc Poulter

Reference Books:

1. System Verilog Testbench Methodology Guide by Janick Bergeron and Chris Spear
2. UVM Cookbook by David L. Barr
3. UVM Verification Methodology: A Practical Guide by Alain Michel
4. UVM Verification: A Practical Guide by Janick Bergeron and Chris Spear

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

M. Tech -Computer Science and Engineering (Data Science)

Course Structure w.e.f. 2024-25

I SEMESTER

Code	Name of the subject	Periods/week		Max.Marks		Total	Credits
		Theory	Lab	Ext.	Int.		
24CS21RC01	Introduction to Data Science	3	-	70	30	100	3
24CS21RC02	Cloud Computing and Virtualization	3	-	70	30	100	3
24CS21PE01	Elective-I	3	-	70	30	100	3
24CS21PE02	Elective-II	3	-	70	30	100	3
24HM21RC01	Research Methodology &IPR	2	-	70	30	100	2
24HM21AC02	Organizational Behavior (Audit Course)	3	-	70	30	100	0
24CS21RC03	Data Science Applications with Python Lab		3	50	50	100	1.5
24CS21RC04	Cloud Computing and Big Data Analytics Lab		3	50	50	100	1.5
	Total	**18**	**6**	**520**	**280**	**800**	**17**

Elective-I: Big Data Analytics, Computational Linear Algebra, Soft Computing, Computational Biology, Internet of Things

Elective II: Cyber Security for Data Science, Optimization Techniques for Data Science, Time Series data Analysis, Natural Language Processing, Statistical Modeling

II SEMESTER

Code	Name of the subject	Periods/week		Max. Marks		Total	Credits
		Theory	Lab	Ext.	Int.		
24CS21RC05	Machine Learning	3	-	70	30	100	3
24CS21RC06	Data Visualization	3	-	70	30	100	3
24CS21PE03	Elective-III	3	-	70	30	100	3
24CS21PE04	Elective-IV	3	-	70	30	100	3
24HM21AC03	Entrepreneurship (Audit Course)	3	-	70	30	100	0
24CS21RC07	Machine Learning Lab	-	3	50	50	100	1.5
24CS21RC08	Data visualization using Tableau Lab	-	3	50	50	100	1.5
24CS21PR01	Mini Project with Seminar	-	4	-	100	100	2
	Total	**15**	**9**	**450**	**350**	**800**	**17**

Elective III: Image and Video Analytics, Social Media Analytics, Deep Learning, Business Analytics, High Performance Computing

Elective IV: Geographic Information System, Block Chain Technology, Secure Software Design, Data Storage Technologies and Networks, Information Retrieval Systems

Annexure-IX

Introduction to Data science

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction to Data Science Applications-Overview of data science and its significance in different domains, Examples of successful data science applications, Ethical considerations in data science, Data Cleaning and Preprocessing, Data quality assessment and improvement techniques, Handling missing data and outliers, Data transformation and feature engineering, Exploratory Data Analysis, Statistical analysis and data visualization, Identifying patterns, correlations, and trends in data, Feature selection techniques.

UNIT II: Applications of Data Science- Data Science Applications in Healthcare, Data Science Applications in Education, Data Science Applications in Manufacturing and Production, Data Science Applications in Sports, Data Science Applications in Cyber-Security, Data Science Applications in Airlines

UNIT III: Widely Used Techniques in Data Science Applications: Supervised Learning, Unsupervised Learning Reinforcement Learning, A/B Testing, Association Rules, Decision Tree, Cluster Analysis, Advantages and Disadvantages of Clustering, Pattern Recognition

UNIT IV: Data Preprocessing: Feature, Feature Selection, Feature Selection Methods, Objective of Feature Selection, Feature Selection Criteria, Feature Generation Schemes, Applications of Feature Selection, Feature Selection: Issues, Different Types of Feature Selection Algorithms. Classification: Classification, Decision Tree, Regression Analysis, Support Vector Machines, Naive Bayes, Artificial Neural Networks

UNIT V: Clustering: Cluster Analysis, Types of Clusters, K-Means, Reducing the SSE with Post-processing ,Bisecting K-Means, Agglomerative Hierarchical Clustering, DBSCAN Clustering Algorithm, Cluster Evaluation, General Characteristics of Clustering Algorithms Usman Qamar, Muhammad Summair Raza

UNIT VI: Text Mining: Text Mining Applications, Exploratory Text Analysis, Information Extraction , Automatic Text Classification, Text Categorization Types, Text Categorization Approaches, Perspectives for Text Categorization ,Text Categorization Applications, Representation of Document, Text Document Preprocessing , Opinion Mining, Sentiment Classification.

UNIT VII: Data Visualization: Principles of effective data visualization, Visualizing relationships, distributions, and trends, Interactive and dynamic visualizations, Applications of Data Science in Business Analytics. Role of Data Science in Revolutionizing Healthcare , BERT- and Fast Text-Based Research Paper Recommender System

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Text Books:

1. "Data Science for Applications: Concepts, Techniques, and Practical Examples", John Smith, Publisher: DataTech Publishing, ISBN: 978-1234567890.

Reference Books:

1. Data Science Techniques and Intelligent Applications, Chapman & Hall/CRC, 2022, Pallavi Vijay Chavan, Parikshit N. Mahalle, Ramchandra Mangrulkar, Idongesit Williams

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Cloud Computing and Virtualization

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction to Cloud: The vision of cloud computing, Defining a cloud, The cloud computing reference model, Characteristics and benefits, Challenges, Principles of Parallel and Distributed Computing, Virtualization: Characteristics and Taxonomy of Virtualization Techniques, Virtualization and cloud computing, Cloud Computing Architecture.

UNIT II: Virtual Machines and Virtualization of Clusters and Data Centres: Implementation Levels of Virtualization, Virtualization Structures/Tools and Mechanisms, Virtualization of CPU, Memory, and I/O Devices, Virtual Clusters and Resource Management, Virtualization for Data-Centre Automation.

UNIT III: Service-Oriented Architectures for Distributed Computing: Services and Service-Oriented Architecture, Message-Oriented Middleware, Workflow in Service-Oriented Architectures.

UNIT IV: Cloud Programming and Software Environments: Parallel and Distributed Programming Paradigms, Programming Support of Google App Engine, Programming on Amazon AWS and Microsoft Azure, Emerging Cloud Software Environments

UNIT V: Grid Computing Systems and Resource Management: Grid Architecture and Service Modelling, Grid Projects and Grid Systems Built, Grid Resource Management and Brokering, Software and Middleware for Grid Computing, Grid Application Trends and Security Measures

UNIT VI: Peer-to-Peer Computing and Overlay Networks: Peer-to-Peer Computing Systems, P2P Overlay Networks and Properties, Routing, Proximity, and Fault Tolerance, Trust, Reputation, and Security Management, P2P File Sharing and Copyright Protection.

UNIT VII: Ubiquitous Clouds and the Internet of Things: Cloud Trends in Supporting Ubiquitous Computing, Performance of Distributed Systems and the Cloud, Enabling Technologies for the Internet of Things, Innovative Applications of the Internet of Things, Online Social and Professional Networking.

Text Books:

1. Kai Hwang, Geoffrey C. Fox and Jack J. Dongarra, "Distributed and cloud computing from Parallel Processing to the Internet of Things", Morgan Kaufmann, Elsevier, 2012.

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Reference Books:

1. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, "Mastering Cloud Computing", Tata Mcgraw Hill, 2013.
2. Cloud Computing:Theory and Practice, Dan C. Marinescu, Morgan Kaufmann, Elsevier, 2012
3. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing – A Practical Approach, Tata Mcgraw Hill, 2009
4. Barrie Sosinsky, "Cloud Computing Bible" John Wiley & Sons, 2010.

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Elective-I Big Data Analytics

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction to big data: What is big data, why big data, convergence of key trends, unstructured data, industry examples of big data, web analytics, big data and marketing, fraud and big data, risk and big data, credit risk management, big data and algorithmic trading, big data and healthcare, big data in medicine, advertising and big data, big data technologies, introduction to Hadoop, open source technologies, cloud and big data,

UNIT II: Introduction to NoSQL, aggregate data models, aggregates, key-value and document data models, relationships, graph databases, schema less databases, materialized views, distribution models, sharding, master-slave replication, peer- peer replication, sharding and replication, consistency, relaxing consistency, version stamps, Working with Cassandra ,Table creation, loading and reading data

UNIT III: Hadoop and Mapreduce: Data formats, analyzing data with Hadoop, scaling out, Architecture of Hadoop distributed file system (HDFS), fault tolerance ,with data replication, High availability, Data locality , Map Reduce Architecture, Process flow, Java interface, data flow, Hadoop I/O, data integrity, compression, serialization

UNIT IV: Introduction to Hive, data types and file formats, HiveQL data definition, HiveQL data manipulation, Logical joins, Window functions, Optimization, Table partitioning, Bucketing, Indexing, Join strategies

UNIT V: Apache spark- Advantages over Hadoop, lazy evaluation, In memory processing, DAG, Spark context, Spark Session, RDD, Transformations- Narrow and Wide, Actions, Data frames ,RDD to Data frames, Catalyst optimizer, Data Frame Transformations, Working with Dates and Timestamps, Working with Nulls in Data, Working with Complex Types, Working with JSON, Grouping,

UNIT VI: Apache spark :Window Functions, Joins, Data Sources, Broadcast Variables, Accumulators, Deploying Spark- On-Premises Cluster Deployments, Cluster Managers-Standalone Mode, Spark on YARN , Spark Logs, The Spark UI- Spark UI History Server, Debugging and Spark First Aid

UNIT VII: Apache spark tuning: Spark-Performance Tuning, Stream Processing Fundamentals, Event-Time and State full Processing - Event Time, State full Processing, Windows on Event Time- Tumbling Windows, Handling Late Data with Watermarks, Dropping Duplicates in a Stream, Structured Streaming Basics - Core Concepts, Structured Streaming in

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Action, Transformations on Streams, Input and Output

Text Books:

1. Big Data, Big Analytics: Emerging, Michael Minnelli, Michelle Chambers, and Ambiga Dhiraj.

Reference Books:

1. SPARK: The Definitive Guide, Bill Chambers & Matei Zaharia, O'Reilley, 2018 Edition
2. Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013
3. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World Polyglot Persistence", Addison-Wesley Professional, 2012
4. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley, 2012
5. "Hadoop Operations", O'Reilley, Eric Sammer, 2012
6. "Programming Hive", O'Reilley, E. Capriolo, D. Wampler, and J. Rutherglen, 2012
7. "HBase: The Definitive Guide", O'Reilley, Lars George, 2011
8. "Cassandra: The Definitive Guide", O'Reilley, Eben Hewitt, 2010
9. "Programming Pig", O'Reilley, Alan Gates, 201

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Elective-I Computational Linear Algebra

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Basic Linear Algebra Subprograms: BLAS: An Introductory Example, Matrix Notations, IEEE Floating Point Systems and Computer Arithmetic, Vector-Vector Operations: Level-1 BLAS, Matrix-Vector Operations: Level-2, BLAS Matrix-Matrix Operations: Level-3 BLAS, Sparse Matrices: Storage and Associated Operations..

UNIT II: Basic Concepts for Matrix Computations: Vector Norms, Complements on Square Matrices, Rectangular Matrices: Ranks and Singular Values, Matrix Norms.

UNIT III: Gauss Elimination and LU Decompositions of Matrices : Special Matrices for LU Decomposition, Gauss Transforms, Naive LU Decomposition for a Square Matrix with Principal Minor Property (pmp), Gauss Reduction with Partial Pivoting: PLU Decompositions, MATLAB Commands Related to the LU Decomposition, Condition Number of a Square Matrix.

UNIT IV: Orthogonal Factorizations and Linear Least Squares Problems : Formulation of Least Squares Problems: Regression Analysis, Existence of Solutions Using Quadratic Forms, Existence of Solutions through Matrix Pseudo-Inverse, The QR Factorization Theorem, Gram-Schmidt Orthogonalization: Classical, Modified, and Block Solving, the Least Squares Problem with the QR Decomposition, Householder QR with Column Pivoting, MATLAB Implementations

UNIT V: Algorithms for the Eigenvalue Problem : Basic Principles, QR Method for a Non-Symmetric Matrix, Algorithms for Symmetric Matrices, Methods for Large Size Matrices, Singular Value Decomposition.

UNIT VI: Iterative Methods for Systems of Linear Equations : Stationary Methods, Krylov Methods, Method of Steepest Descent for spd Matrices, Conjugate Gradient Method (CG) for spd Matrices, The Generalized Minimal Residual Method, The Bi-Conjugate Gradient Method, Preconditioning Issues.

UNIT VII: Sparse Systems to Solve Poisson Differential Equations : Poisson Differential Equations, The Path to Poisson Solvers, Finite Differences for Poisson-Dirichlet Problems, Variational Formulations, One-Dimensional Finite-Element Discretizations.

Text Books:

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1. INTRODUCTION TO COMPUTATIONAL LINEAR ALGEBRA by Nabil Nassif, Jocelyne Erhel, Bernard Philippe. CRC Press, Taylor & Francis Group, 6000 Broken Sound Parkway NW, Suite 300 Boca Raton, FL 33487-2742, 2016.

Reference Books:

1. Gilbert Strang, Linear Algebra and its Applications, Fourth Edition, Cambridge University Press. 2009.
2. Gene H. Golub and V. Van Loan, Matrix Computations, Third Edition, John Hopkins University Press, Baltimore, 1996.
3. David C. Lay, Linear Algebra and Its Applications, Pearson Addison Wesley, 2002.
4. Strang, Gilbert. Linear algebra and learning from data. Cambridge: Wellesley-Cambridge Press, 2019.

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Elective-I

Soft Computing

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction: What is Soft Computing? ,Fuzzy Systems,Rough Sets, Artificial Neural Networks, Evolutionary Search Strategies,
FUZZY SETS: Crisp Sets, Fuzzy Sets, Fuzzy Membership Functions, Operations on Fuzzy Sets, Fuzzy Relations, Fuzzy Extension Principle.

UNIT II: Fuzzy Logic: Crisp Logic, Fuzzy Logic Basics, Fuzzy Truth in Terms of Fuzzy Sets, Fuzzy Rules, Fuzzy Reasoning,

UNIT III: Fuzzy Inference Systems: Introduction, Fuzzification of the Input Variables, Application of Fuzzy Operators on the Antecedent Parts of the Rules, Evaluation of the Fuzzy Rules, Aggregation of Output Fuzzy Sets Across the Rules, Defuzzification of the Resultant Aggregate Fuzzy Set, Fuzzy Controllers.

UNIT IV: Rough Sets: Information Systems and Decision Systems, Indiscernibility, Set Approximations, Properties of Rough Sets.

UNIT V: Neural Networks: Machine Learning Using Neural Network, Adaptive Networks, Feed forward Networks, Supervised Learning Neural Networks, Radial Basis Function Networks: Reinforcement Learning, Unsupervised Learning Neural Networks, Adaptive Resonance architectures

UNIT VI: Basics of Genetic Algorithms: Introduction to Genetic Algorithms (GA), Applications of GA in Machine Learning: Machine Learning Approach to Knowledge Acquisition.

UNIT VII: Deep Networks : Introduction to Deep learning – Deep neural networks – concepts. Recurrent neural network - concepts – applications.

Text Books:

1. Samir Roy, Udit Chakraborty, Introduction to Soft Computing: Neuro-Fuzzy and Genetic Algorithms, Pearson, 2013

Reference Books:

1. Jyh-Shing Roger Jang, Chuen:Tsai Sun, EijiMizutani, Neuro:Fuzzy and Soft Computing®,Prentice Hall of India, 2003

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2. Saroj Kaushik, Sunita Tiwari, Soft computing: Fundamentals, Techniques and applications,Mc Graw Hill Education, 2018
3. Sivanandam&Deepa, "Principles of Soft Computing", 2nd Edition, Wiley India, 2011
4. Snehashish Chakraverty, Deepti Moyi Sahoo, Nisha Rani Mahato,Concepts of Soft Computing: Fuzzy and ANN with Programming, Springer,2019.
5. Samir Roy, Udit Chakraborty, Introduction to Soft Computing: Neuro-Fuzzy and Genetic Algorithms, Pearson, 2013.
6. D. E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", 1st Edn, Pearson, 2016

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Elective-I Computational Biology

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: DNA computing: Motivation- DNA structure- processing and computational operations- steps involved in DNA computation- Filtering models: Adleman's experiment-Lipton's solution-Scope and Applications of DNA computing- Search Algorithms: Hill climbing, Simulated annealing:-introduction-Simulated annealing algorithm.

UNIT II: Combinatorial Pattern Matching: Hash Tables, Repeat Finding, Exact Pattern Matching; Genetic Algorithm: Basic Concepts, Reproduction, Cross over, Mutation, Fitness Value, Optimization using GAs; Applications of GA in bioinformatics.

UNIT III: Hidden Markov Model: Markov processes and Markov Models, Hidden Markov Models. Forward and Backward Algorithms, Most probable state path: Viterbi algorithm, Parameter Estimation for HMMs:-Baum-Welch Algorithm, Applications of profile HMMs for multiple alignment of proteins and for finding genes in the DNA

UNIT IV: Designing Effective Visualizations: -Steps in Designing Visualizations,- Problems in Designing Effective Visualizations.- Comparing and Evaluating Visualization Techniques-User Tasks- User Characteristics Data Characteristics -Visualization Characteristics-,Structures for Evaluating Visualizations Benchmarking Procedures-,An Example of Visualization Benchmarking

UNIT V: Support Vector Machines: Introduction- hyperplane separation (maximum and soft margin hyperplanes)-linear classifier-Kernel functions, Large Margin Classification, Optimization problem with SVM- Applications of SVM in bioinformatics

UNIT VI: Bayesian network: Bayes Theorem-Inference and learning of Bayesian network- BN and Other Probabilistic Models

UNIT VII: Artificial Neural Network: Historic evolution – Perceptron, characteristics of neural networks terminology, models of neuron Mc Culloch – Pitts model, Perceptron, Adaline model, Basic learning laws, Topology of neural network architecture, single layer ANN, multilayer perceptron, back propagation learning, input - hidden and output layer computation, back propagation algorithm, Applications of ANN.

Text Books:

1. An introduction to bioinformatics algorithms by Neil C. Jones, Pavel Pevzner. MIT Press.2004.

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Reference Books:

1. Biological sequence analysis: Probabilistic models of proteins and nucleic acids by Richard Durbin, Eddy, Anders Krogh, 1998
2. Algorithms for Molecular Biology by Ron Shamir Lecture, Fall Semester, 2001
3. Neural Networks: A Systematic Introduction by Raul Rojas. Springer. 1996
4. Artificial Intelligence and Games by Georgios N. Yannakakis and Julian Togelius, Springer 2018
5. Bioinformatics: the machine learning approach by Pierre Baldi, Søren Brunak. MIT Press.2001.
6. Bioinformatics: Sequence and Genome Analysis: by David Mount, University of Arizona,Tucson. 2005
7. Fundamentals of natural computing : Basic concepts, Algorithms and Applications, Chapman & Hall / CRC, Taylor & Francis group, 2006

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Elective-I Internet of Things

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Fundamentals of IoT: Evolution of Internet of Things, Enabling Technologies, IoT Architectures: oneM2M, IoT World Forum (IoTWF) and Alternative IoT models, Simplified IoT Architecture and Core IoT Functional Stack, Fog, Edge and Cloud in IoT, Functional blocks of an IoT ecosystem, Sensors, Actuators, Smart Objects and Connecting Smart Objects

UNIT II: IoT Protocols: IoT Access Technologies: Physical and MAC layers, topology and Security of IEEE 802.15.4, 802.15.4g, 802.15.4e, 1901.2a, 802.11ah and LoRaWAN, Zigbee protocol, Network Layer: IP versions, Constrained Nodes and Constrained Networks

UNIT III: Optimizing IP for IoT: From 6LoWPAN to 6Lo, Routing over Low Power and Lossy Networks, Application Transport Methods: Supervisory Control and Data Acquisition, Application Layer Protocols: CoAP and MQTT

UNIT IV: Design and Development: Design Methodology, Embedded computing logic, Microcontroller, System on Chips, IoT system building blocks, Arduino–Board details, IDE programming, Raspberry Pi and Interfaces

UNIT V: Data Analytics and Supporting Services: Structured Vs Unstructured Data and Data in Motion Vs Data in Rest, Role of Machine Learning-No SQL Databases, Hadoop Ecosystem, Apache Kafka, Apache Spark, Edge Streaming Analytics and Network Analytics, Xively Cloud for IoT

UNIT VI: Python Web Application Framework, Django, AWS for IoT, System Management with NETCONF-YANG, Kibana, Fault-tolerant data processing on devices.

UNIT VII: Case Studies/Industrial Applications: Cisco IoT system, IBM Watson IoT platform, Manufacturing, Converged Plantwide Ethernet Model (CPwE), Power Utility Industry, GridBlocks Reference Model, Smart and Connected Cities: Layered architecture, Smart Lighting, Smart Parking Architecture and Smart Traffic Control

Course outcome: At the end of the course.

Text Books:

1. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, IoT Fundamentals:Networking Technologies, Protocols and Use Cases for Internet of Things, Cisco Press, 2017

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Reference Books:

1. Arshdeep Bahga, Vijay Madisetti, Internet of Things – A hands-on approach, Universities Press, 2015.
2. Olivier Hersent, David Boswarthick, Omar Elloumi , The Internet of Things – Key applications and Protocols, Wiley, 2012
3. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stamatis, Karnouskos, Stefan Avesand, DavidBoyle, From Machine-to-Machine to the Internet of Things –Introduction to a New Age of Intelligence, Elsevier, 2014.
4. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), Architecting the Internet of Things, Springer, 2011.
5. Michael Margolis, Arduino Cookbook, Recipes to Begin, Expand, and Enhance Your Projects, 2nd Edition, O'Reilly Media, 2011

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Elective-II Cyber Security for Data Science

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction to Cyber Security-Cyber security objectives, roles, differences between information security and cyber security, Cyber security principles-confidentiality, integrity, availability, authentication and non-repudiation.

UNIT II: Information Security within Lifecycle Management-Lifecycle management landscape, Security architecture processes, Security architecture tools, Intermediate lifecycle management concepts.

UNIT III: Risks & Vulnerabilities-Basics of risk management, Operational threat environments, Classes of attacks.

UNIT IV: Incident Response-Incident categories, Incident response, Incident recovery, **Operational security protection**-Digital and data assets, ports and protocols, Protection technologies, Identity and access Management, configuration management.

UNIT V: Threat Detection and Evaluation Monitoring-Vulnerability management, Security logs and alerts, Monitoring tools and appliances

UNIT VI: Analysis-Network traffic analysis, packet capture and analysis.

UNIT VII: Data Visualization: Introduction to backdoor System and security-Introduction to metasploit, backdoor, demilitarized zone (DMZ), Digital signature, Brief study on Harding of operating system.

Text Books:

1. NASSCOM: Security Analyst Student Hand Book, Dec 2015

Reference Books:

1. Information Security Management Principles, Updated Edition, David Alexander, Amanda Finch, David Sutton, BCS publishers, June 2013.
2. Cyber Security Fundamentals-Cyber Security, Network Security and Data Governance Security, 2nd Edition, ISACA Publishers

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Elective-II OPTIMIZATION TECHNIQUES FOR DATA SCIENCE

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction- mathematical optimization, least-squares and linear programming, convex and nonlinear optimization. convex sets.

UNIT II: Convex optimization problems - optimization problem in standard form, convex optimization problems, quasi-convex optimization, linear optimization

UNIT III: Quadratic optimization: generalized inequality constraints, semi definite programming, vector optimization. Duality, approximation and fitting, statistical estimation, geometric problems

UNIT IV: Unconstrained minimization- gradient descent method, steepest descent method, Newton's method.

UNIT V: Equality constrained minimization - equality constrained minimization, eliminating equality constraints, Newton's method with equality constraints, infeasible start Newton method, and implementation.

UNIT VI: Interior-point methods -inequality constrained minimization, logarithmic barrier function and central path, barrier method, L1 Norm optimization methods.

UNIT VII: Introduction to Neural Networks - Alternating direction method of multipliers (ADMM) and applications (16 applications mentioned by Prof. Stephen Boyd)

Text Books:

1. Kalyanmoy, Deb. Optimization for engineering design: Algorithms and examples. Prentice-Hall of India Pvt. Limited, 2012.

Reference Books:

1. Chong, Edwin KP, and Stanislaw H. Zak. An introduction to optimization. John Wiley & Sons, 2004.
2. Bhatti, M. Asghar. Practical Optimization Methods: With Mathematica® Applications. Springer Science & Business Media, 2012
3. Stephen P. Boyd, and Lieven Vandenberghe. Convex optimization. Cambridge university press, 2004

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Elective-II Time Series Data Analysis

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction to time series analysis, stationary and non stationary datasets. Finding the trend and seasonal components of signal. Auto Correlation Function (ACF) and Partial Auto Correlation Function (PACF).

UNIT II: Stationary Process and ARMA Models: Forecasting stationary time series using ARMA.

UNIT III: Nonstationary and Seasonal Time Series Models: Seasonal ARIMA models.

UNIT IV: Multivariate Time Series: Multivariate ARMA processes, Modeling and forecasting

UNIT V: Forecasting Techniques: The Holt-Winter algorithm & Holt-Winter seasonal algorithm.

UNIT VI: Time series forecasting using ML algorithms: Linear Regression ,Multi Linear Regression and ensemble techniques.

UNIT VII: Introduction to Recurrent Neural Networks (RNN), Long Short Term Memory (LSTM) and its role in time series forecasting.

Text Books:

1. Brockwell, Peter J. and Davis, Richard A. (2002). Introduction to Time Series and Forecasting, 2nd edition. Springer-Verlag, New York.

Reference Books:

1. Shumway, R.H and Stoffer, D.S., Time Series Analysis and its Applications: With r Examples, Springer.
2. Box, G.E.P., Jenkins, G.M. and Reinsel, G.C. (1994). Time Series Analysis: Forecasting and Control, 3rd Edition, Prentice Hall, New Jersey.
3. Chatfield, C. (1996). The Analysis of Time Series, 5th edition, Chapman and Hall, New York.
4. James D. Hamilton (1994). Time Series Analysis, 1st Edition, Princeton University Press

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Elective-II Natural Language Processing

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: INTRODUCTION: Origins and challenges of NLP - Language Modelling: Grammar-based LM, Statistical LM - Regular Expressions, Finite-State Automata - English Morphology, Transducers for lexicon and rules,
Tokenization, Detecting and Correcting Spelling Errors, Minimum Edit Distance.

UNIT II: WORD LEVEL ANALYSIS: Unsmoothed N-grams, Evaluating N-grams, Smoothing, Interpolation and Backoff - Word Classes.

UNIT III: MODELS FOR SEQUENTIAL TAGGING: Smoothing, Interpolation and Backoff - Word Classes, Part of-
Speech Tagging, Rule-based, Named Entities and Named Entities Tagging, Evaluation of Named Entity Recognition,Vector Semantics Embedding, Lexical Semantics.

UNIT IV: SYNTACTIC ANALYSIS: Context-Free Grammars, Grammar rules for English, Treebanks, Normal Forms for grammar -Dependency Grammar - Syntactic Parsing, Ambiguity

UNIT V: DYNAMIC PROGRAMMING PARSING- Shallow parsing– Probabilistic CFG, Probabilistic CYK, Probabilistic Lexicalized CFGs – Feature structures, Unification of feature structures.

UNIT VI: SEMANTICS AND PRAGMATICS: Requirements for representation, First-Order Logic, Description Logics – Syntax-Driven Semantic analysis, Semantic attachments – Word Senses, Relations between Senses, Thematic Roles, selectional restrictions – Word Sense Disambiguation, WSD using Supervised, Dictionary & Thesaurus,
Bootstrapping methods – Word Similarity using Thesaurus and Distributional methods.

UNIT VII: DISCOURSE ANALYSIS AND LEXICAL RESOURCES: Discourse segmentation, Coherence – Reference Phenomena, Anaphora Resolution using Hobbs and Centering Algorithm – Coreference Resolution – Resources: Porter Stemmer, Lemmatizer, WordNet, PropBank, FrameNet, Brown Corpus, British National Corpus(BNC).

Text Books:

1. Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech, 2nd Edition, Daniel Jurafsky, James H. Martin—Pearson Publication, 2014.

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Reference Books:

1. Natural Language Processing with Python, First Edition, Steven Bird, Ewan Klein and Edward Loper, OReilly Media, 2009.
2. Language Processing with Java and LingPipe Cookbook, 1st Edition, Breck Baldwin, Atlantic Publisher, 2015.
3. Handbook of Natural Language Processing, Second, Nitin Indurkhya and Fred J. Damerau, Chapman and Hall/CRC Press, 2010. Edition.
4. Natural Language Processing and Information Retrieval, 3rd Edition, Tanveer Siddiqui, U.S. Tiwary, Oxford University Press, 2008.

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Elective-II Statistical Modeling

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction to Random process, types and their probability distributions, Expectation, mean and variance,

UNIT II: Sampling: Estimating the Population Mean (μ), Population Proportion, Sample Size and its Determination. Sample Size through the Approach Based on Precision Rate and Confidence Level.

UNIT III: Hypothesis testing- Z, t, Chi-Square & F-test. ANOVA & Designs of Experiments - Single, Two factor ANOVA, Factorials ANOVA models.

UNIT IV: Model selection, AIC, BIC, SIC, bias-variance trade-off; ARMA models.

UNIT V: Univariate Regression and its estimation techniques and analysis

UNIT VI: Multivariate Regression and its estimation techniques and analysis

UNIT VII: State-space models, Kalman filter, hidden state, HMM, Switching models, hidden Markov models.

Text Books:

1. Jay L. Devore, Probability and Statistics for Engineering and the Sciences, 8th edition, Cengage, 2012.

Reference Books:

1. T. VeeraRajan, Probability, Statistics and Random processes, Tata McGraw-Hill,2008
2. Research Methodology: Methods and Techniques: C.R. Kothari, New Age International Publishers
3. Sheldon M. Ross, Introduction to probability and statistics for engineers and scientists, 4th edition, Elsevier, 2009.
4. Levin R.I. and Rubin D.S., Statistics for Management, 7th edition, Prentice Hall of India Pvt. Ltd., New Delhi, 2001

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Data Science Applications with Python Lab

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week **Time: 3 Hours** **Credits: 2**
Internal: 50 Marks **External: 50 Marks** **Total: 100 Marks**

Experiment 1:
Write a Python Program to Find the Sum of the Series: 1 + 1/2 + 1/3 + .. + 1/N

Experiment 2:
Write a Python Program to Split the array and add the first part to the

Experiment 3:
Write a Python Program to Create a List of Tuples with the First Element as the Number and Second Element as the Square of the Number

Experiment 4:
Write a Python program to count number of vowels using sets in given string

Experiment 5:
Write a program to implement permutation of a given string using inbuilt function.

Experiment 6:
Write a python program to sort list of dictionaries by values in Python – Using lambda function.

Experiment 7:
Write a Python Program for following sorting:
i. Quick Sort ii. Heap Sort

Experiment 8:
Write a Python Program to Reverse a String Using Recursion

Experiment 9:
Write a Python Program to Count the Number of Words in a Text File

Experiment 10:
Write a Python Program to Read the Contents of a File in Reverse Order

Experiment 11:
Write a program to Merge and Join DataFrames with Pandas in Python

Experiment 12:

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Annexure-XXI

Write a program to implement Merge and Join DataFrames with Python Pandas

Experiment 13:
Write a Python Program to Append the Contents of One File to Another File

Experiment 14:
How to install and Load CSV files to Python Pandas

Experiment 15:
Write a program to implement Data analysis and Visualization with Python using pandas.

Experiment 16:
Write a program to Implement Plotting Functions in python pandas

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Cloud Computing and Big Data Analytics Lab

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 2**
Internal: 50 Marks	**External: 50 Marks**	**Total: 100 Marks**

Cloud Computing Programs:

Experiment-1

Create Virtual Machine on Azure

a. A Windows VM
b. Linux VM

Experiment-2

Create a Web app and host it in Azure, use web app to accept files and upload them to blob storage

a. Create Storage accounts in Azure and upload files
b. Create SQL Database to store info
c. Use Azure KeyVault to store secrets such as connection strings
d. Use managed Identity to access secrets from KeyVault, access SQL DB & storage accounts
e. Create Service Bus to accept messages
f. Create App Insights to get logging
g. Create Azure Monitor to get notifications

Experiment-3

Create a function apps

a. Create function app with HTTP trigger
b. Create function app with Timer trigger
c. Create function app with Storage trigger
d. Create Service bus trigger to process messages asynchronously

Experiment-4

Create Traffic Manager / Azure Front Door & APIM

a. Identify the best case scenarios for these

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Experiment-5

Create a Tenant in Azure Active directory

a. Create users in the tenant and use Microsoft Authentication Library (MSAL)
b. Use Azure AD as Identity provider for your web apps

Experiment-6

Create a Azure container registry

a. Deploy a container from the registry to an AppService
b. Create an Azure Kubernetes Cluster and deploy

Experiment-7

Create an Azure Open AI service and use them in your application

Big Data Analytics Programs:

Experiment-1

Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.

Experiment-2

Write a Map Reduce program that mines weather data. Weather sensors collecting data every hour at many locations across the globe gather large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented.
Data available at: https://github.com/tomwhite/hadoopbook/tree/master/input/ncdc/all

Experiment 3:

Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.

Experiment 4:

Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and Indexes

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Machine Learning

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction-Towards Intelligent Machines, Well posed Problems, Example of Applications in diverse fields, Data Representation, Domain Knowledge for Productive use of Machine Learning, Diversity of Data: Structured / Unstructured, Forms of Learning, Machine Learning and Data Mining, Basic Linear Algebra in Machine Learning Techniques.

UNIT II: Supervised Learning- Rationale and Basics: Learning from Observations, Bias and Why Learning Works: Computational Learning Theory, Occam's Razor Principle and Overfitting Avoidance Heuristic Search in inductive Learning, Estimating Generalization Errors, Metrics for assessing regression, Metris for assessing classification

UNIT III: Statistical Learning- Machine Learning and Inferential Statistical Analysis, Descriptive Statistics in learning techniques, Bayesian Reasoning: A probabilistic approach to inference, K-Nearest Neighbor Classifier. Discriminant functions and regression functions, Linear Regression with Least Square Error Criterion, Logistic Regression for Classification Tasks, Fisher's Linear Discriminant and Thresholding for Classification, Minimum Description Length Principle

UNIT IV: Support Vector Machines (SVM)- Introduction, Linear Discriminant Functions for Binary Classification, Perceptron Algorithm, Large Margin Classifier for linearly seperable data, Linear Soft Margin Classifier for Overlapping Classes, Kernel Induced Feature Spaces, Nonlinear Classifier, Regression by Support vector Machines

UNIT V: Learning with Neural Networks: Towards Cognitive Machine, Neuron Models, Network Architectures, Perceptrons, Linear neuron and the Widrow-Hoff Learning Rule, The error correction delta rule

UNIT VI: MLP: Multilayer Perceptron Networks and error back propagation algorithm, Radial Basis Functions Networks

UNIT VII: Decision Tree Learning: Introduction, Example of classification decision tree, measures of impurity for evaluating splits in decision trees, ID3, C4.5, and CART decision trees, pruning the tree, strengths and weakness of decision tree approach.

Text Books:

1. Applied Machine Learning, M.Gopal, Mc Graw Hill Education.

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Reference Books:

1. Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2007.
2. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press, 2012
3. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer 2009 (freely available online).

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Data Visualization

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction: What Is Visualization?- History of Visualization- Relationship between Visualization and Other fields – The Visualization Process-Pseudocode Conventions-The Scatterplot and The Role of the User.- Data Foundations Types of Data, Structure within and between Records-Data Pre-processing.

UNIT II: Human Perception and Information Processing: What Is Perception? –Physiology-Perceptual Processing- Perception in Visualization- Metrics Visualization Foundations.- The Visualization Process in Detail-Semiology of Graphical Symbols-The Eight Visual Variables-Historical Perspective-Taxonomies-Metrics Visualization Foundations-TheVisualization Process in Detail-Semiology of Graphical Symbols-The Eight Visual Variables-Historical Perspective-Taxonomies

UNIT III: Interaction Concepts: Interaction Operators-Interaction Operands and Spaces,- A Unified Framework.- Interaction Techniques- Screen Space, Object Space (D Surfaces), Data Space (Multivariate Data Values)-Attribute Space (Properties of Graphical Entities)-Data Structure Space (Components of Data Organization)- Visualization Structure Space (Components of the Data Visualization).-Animating Transformations Interaction Control.

UNIT IV: Designing Effective Visualizations: -Steps in Designing Visualizations,- Problems in Designing Effective Visualizations.- Comparing and Evaluating Visualization Techniques-User Tasks- User Characteristics Data Characteristics -Visualization Characteristics-,Structures for Evaluating Visualizations Benchmarking Procedures-,An Example of Visualization Benchmarking

UNIT V: Visualization Systems: Systems Based on Data Type-Systems Based on Data Analysis Type-Text Analysis and Visualization-Modern Integrated Visualization Systems Toolkits

UNIT VI: Research Directions in Visualization: Issues of Data Issues of Cognition-Perception, and Reasoning-Issues of System Design-Issues of Evaluation-Issues of Hardware-Issues of Applications

UNIT VII: Visualization Techniques for Spatial Data: One-Dimensional Data,-Two-Dimensional Data-Three-Dimensional Data-Dynamic Data Combining Techniques
Visualization Techniques for Time-Oriented Data:Introduction, Definitions-Characterizing Time-Oriented Data-Visualizing Time-Oriented Data-Time Bench: A Data Model and Software Library for Visual Analytics of Time-Oriented Data

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Text Books:

1. Ward, Grinstein Keim, Interactive Data Visualization: Foundations, Techniques, and Applications. Natick: A K Peters, Ltd,2015.

Reference Books:

1. Charu C. Aggarwal, Recommender Systems: The Textbook, 1/e, Springer, 2016.
2. Ricci F., Rokach L., Shapira D., Kantor B.P., Recommender Systems Handbook, Springer, 2015.
3. Manouselis N., Drachsler H., Verbert K., Duval E., Recommender Systems for Learning, Springer, 2013. (no update)
4. Kristen Sosulski, Data Visualization Made Simple: Insights into Becoming Visual, Routledge; 1st edition,2018

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Elective-III Image and Video Analytics

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Digital image representation- Visual Perception- Sampling and Quantization- Basic Relations between Pixels- Mathematical Tools Used in Digital Image Processing: Fundamental Operations –Vector and Matric Operations- Image Transforms (DFT, DCT, DWT, Hadamard)..

UNIT II: Fundamentals of spatial filtering: spatial correlation and convolution-smoothingblurringsharpening- edge detection - Basics of filtering in the frequency domain: smoothing-blurring- sharpening- -Histograms and basic statistical models of image.

UNIT III: Colour models and Transformations – Image and Video segmentation-Image and video demonising- Image and Video enhancement- Image and Video compression

UNIT IV: Object detection and recognition in image and video-Texture models Image and Video classification models- Object tracking in Video.

UNIT V: Applications and Case studies- Industrial- Retail- Transportation & Travel- Remote sensingVideo Analytics in WSN: IoT Video Analytics Architectures.

Text Books:

1. " Digital Image Processing". 3rd Edition, R.C. Gonzalez and R.E. Woods Addison Wesley, 2007.

Reference Books:

1. "Computer Vision: Algorithms and Applications", Richard Szelisk, Springer 2011
2. "Nonparametric and Semi parametric Models", W. Härdle, M. Müller, S. Sperlich, A. Werwatz, Springer, 2004.
3. "Intelligent Video Surveillance Systems", Jean-Yves Dufour, Wiley, 2013.
4. "Video Analytics for Business Intelligence", Caifeng Shan, Fatih Porikli, Tao Xiang, Shaogang Gong, Springer, 2012.
5. "Intelligent Transport Systems: Technologies and Applications", AsierPerallos, Unai HernandezJayo, Enrique Onieva, Ignacio Julio García Zuazola, Wiley,2015.
6. "Analysis of Urban Growth and Sprawl from Remote Sensing Data", Basudeb Bhatta, Springer, 2010

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Elective-III Social Media Analytics

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Social Media Analytics: An Overview Core Characteristics of Social Media, Types of Social Media, Social media landscape, Need for Social Media Analytics (SMA), SMA in small & large organizations. Purpose of Social Media Analytics, Social Media vs. Traditional Business Analytics, Seven Layers of Social Media Analytics, Types of Social Media Analytics, Social Media Analytics Cycle, Challenges to Social Media Analytics, Social Media Analytics Tools.

UNIT II: Social Network Structure, Measures & Visualization Basics of Social Network Structure - Nodes, Edges & Tie Describing the Networks Measures - Degree Distribution, Density, Connectivity, Centralization, Tie Strength & Trust Network Visualization - Graph Layout, Visualizing Network features, Scale Issues. Social Media Network Analytics - Common Network Terms, Common Social Media Network Types, Types of Networks, Common Network Terminologies, Network Analytics Tools

UNIT III: Social Media Text, Action & Hyperlink Analytics

Social Media Text Analytics - Types of Social Media Text, Purpose of Text Analytics, Steps in Text Analytics, Social Media Text Analysis Tools Social Media Action Analytics - What Is Actions Analytics? Common Social Media Actions, Actions Analytics Tools Social Media Hyperlink Analytics - Types of Hyperlinks, Types of Hyperlink Analytics, Hyperlink Analytics Tools

UNIT IV: Social Media Location & Search Engine Analytics Location Analytics - Sources of Location Data, Categories of Location Analytics, Location Analytics and Privacy Concerns, Location Analytics Tools Search Engine Analytics - Types of Search Engines, Search Engine Analytics, Search Engine Analytics Tools

UNIT V: Social Information Filtering Social Information Filtering - Social Sharing and filtering , Automated Recommendation systems, Traditional Vs. social Recommendation Systems Understanding Social Media and Business Alignment, Social Media KPI, Formulating a Social Media Strategy, Managing Social Media Risks

UNIT VI: Social Media Analytics Applications Social media in public sector - Analysing public sector social media, analysing individual users, case study. Business use of Social Media - Measuring success, Interaction and monitoring, case study

UNIT VII: Social Media Analytics Privacy: Privacy - Privacy policies, data ownership and maintaining privacy online.

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Text Books:

1. Seven Layers of Social Media Analytics_ Mining Business Insights from Social Media Text, Actions, Networks, Hyperlinks, Apps, Search Engine, and Location Data, Gohar F. Khan,(ISBN-10: 1507823207)..

Reference Books:

1. Analyzing the Social Web 1st Edition by Jennifer Golbeck
2. Mining the Social Web_ Analyzing Data from Facebook, Twitter, LinkedIn, and Other Social Media Sites, Matthew A Russell, O'Reilly
3. Charu Aggarwal (ed.), Social Network Data Analytics, Springer, 2011
4. Social Media Analytics [2015], Techniques and Insights for Extracting Business Value Out of Social Media, Matthew Ganis, AvinashKohirkar, IBM Press
5. Social Media Analytics Strategy_ Using Data to Optimize Business Performance, Alex Gonçalves, APress Business Team
6. Social Media Data Mining and Analytics, Szabo, G., G. Polatkan, O. Boykin & A. Chalkiopoulus (2019), Wiley, ISBN 978-1-118-82485-6

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Elective-III Deep Learning

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Basics of Deep leaning- Deep learning architectures, Convolution Neural Networks, Neurons in Human Vision-The Shortcomings of Feature Selection-Vanilla Deep Neural Networks Don't Scale-Filters and Feature Maps-Full Description of the Convolution Layer-Max Pooling-Full Architectural Description of Convolution Networks-Closing the Loop on MNIST with Convolutional Networks-Image Preprocessing Pipelines Enable More Robust Models-Accelerating Training with Batch Normalization

UNIT II: Building a Convolutional Network for CIFAR-10-Visualizing Learning in Convolutional NetworksLeveraging Convolutional Filters to Replicate Artistic Styles-Learning Convolutional Filters for Other Problem Domains-Training algorithms

UNIT III: Memory Augmented Neural Networks : Neural Turing Machines-Attention-Based Memory Access-NTM Memory Addressing Mechanisms-Differentiable Neural Computers-Interference-Free Writing in DNCs-DNC Memory Reuse-Temporal Linking of DNC Writes-Understanding the DNC Read Head-The DNC Controller Network- Visualizing the DNC in Action-Implementing the DNC in TensorFlow-Teaching a DNC to Read and Comprehend

UNIT IV: Deep Reinforcement Learning: Deep Reinforcement Learning Masters Atari Games- What Is Reinforcement Learning?-Markov Decision Processes (MDP)-Explore Versus Exploit-Policy versus Value Learning-Pole-Cart with Policy Gradients-Q-Learning and Deep Q-Networks-Improving and Moving Beyond DQN

UNIT V: Implementing Neural Networks in TensorFlow : What Is TensorFlow?-How Does TensorFlow Compare to Alternatives?-Installing TensorFlow-Creating and Manipulating TensorFlow VariablesTensorFlow Operations-Placeholder Tensors

UNIT VI: Sessions in TensorFlow-Navigating Variable Scopes and Sharing Variables- Managing Models over the CPU and GPU-Specifying the Logistic Regression Model in TensorFlow-Logging and Training the Logistic Regression Model-Leveraging TensorBoard to Visualize

UNIT VII: Computation Graphs and Learning-Building a Multilayer Model for MNIST in TensorFlow. Applications: Deep learning for computer vision, Deep Learning Applications at the Enterprise Scale, Deep Learning Models for Healthcare Applications

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Text Books:

1. "Fundamentals of Deep Learning: Designing Next-Generation Machine Intelligence Algorithms", Nikhil Buduma, Nicholas Locascio, O'Reilly Media, 2017.

Reference Books:

1. "Deep Learning (Adaptive Computation and Machine Learning series", Ian Goodfellow, Yoshua Bengio, Aaron Courville, MIT Press, 2017
2. Deep learning from first principle,2nd edition,tinniam v Ganesh,2018
3. Introduction to Deep Learning ,1st edition, by Eugene charniak,The MIT Press,2019

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Elective-III Business Analytics

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Business statistics- Intro to Probability, Discrete Random Variables- Measures of central tendency-measures of dispersion-correlation methods

UNIT II: Python and R programming- Data Types-Decision Structures-Functions –File operations and Libraries and packages

UNIT III: Managing data resources- types of databases- Big Data NoSQL databases-DataWarehousing and Data mining techniques

UNIT IV: Data science forecasting techniques/tools- Statistical Forecasting Models-Forecasting Models for Stationary Time Series-Forecasting Models for Time Series with a Linear Trend, Forecasting Time Series with Seasonality, Regression Forecasting with Casual Variables, Selecting Appropriate Forecasting Models

UNIT V: Data visualization- Visualization techniques for business data- Line charts-Bar charts-Pie charts-Bubble charts-Histograms-Heatmaps- Scatter plot st-SNE

UNIT VI: Business applications-E-business systems-digital marketing systems-Transactional processing systems-Enterprise Application architecture and integration.Case studies

UNIT VII: Development and security challenges in business analytics Ethical responsibility of Business professionals-Privacy issues-security challenges-Introduction to Access Control, Purpose and fundamentals of access control, brief history.Policies of Access Control, Models of Access Control

Text Books:

1. Ramesh Behl: Business information systems,McGraw Hill..

Reference Books:

1. James Evans:Business Analytics, Pearson Education, 2013.
2. S.C Gupta : Fundamentals of Statistics

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Elective-III High Performance Computing

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction to Parallel Computing: Scope of Parallel Computing, Implicit Parallelism: Trends in Microprocessor Architectures, Limitations of Memory System Performance, Dichotomy of Parallel Computing Platforms, Physical Organization of Parallel Platforms, Communication Costs in Parallel Machines. Taxonomy of parallel computing paradigms, Shared-memory computers, Distributed-memory computers.

UNIT II: Analytical Modelling of Parallel Programs: Sources of Overhead in Parallel Programs, Performance Metrics for Parallel Systems, The Effect of Granularity on Performance, Scalability of Parallel Systems, Minimum Execution Time and Minimum Cost-Optimal Execution Time, Asymptotic Analysis of Parallel Programs

UNIT III: Programming Using the Message-Passing Paradigm: Principles of Message-Passing Programming, The Building Blocks: Send and Receive Operations, MPI: the Message Passing Interface, Topologies and Embedding, Overlapping Communication with Computation, Groups and Communicators

UNIT IV: Distributed-memory parallel programming with MPI: Message passing, A short introduction to MPI, Example: MPI parallelization of a Jacobi solver, MPI performance tools, Communication parameters, Synchronization, serialization, contention, Reducing communication overhead

UNIT V: Shared-memory parallel programming with OpenMP: Short introduction to OpenMP, OpenMP-parallel Jacobi algorithm, Wavefront parallelization, Profiling OpenMP programs, Performance pitfalls, Case study: Parallel sparse matrix-vector multiply

UNIT VI: Locality optimizations on ccNUMA architectures: Locality of access on ccNUMA, Case study: ccNUMA optimization of sparse MVM, Placement pitfalls, ccNUMA issues with C++.

UNIT VII: Parallel Algorithms on Sorting, Dense Matrix Algorithms, Graph Algorithms

Text Books:

1. Georg Hager and Gerhard Wellein. Introduction to High Performance Computing for Scientists and Engineers (1st ed.). CRC Press, Chapman & Hall/CRC Computational Science, India, 2010.

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Reference Books:

1. Vipin Kumar , Ananth Grama , Anshul Gupta , George Karypis. Introduction to Parallel Computing (2nd ed.). Pearson India . 2003.
2. John L. Hennessy and David A. Patterson. Computer Architecture: A Quantitative Approach (5th ed.). Elsevier India Pvt. Ltd. 2011.
3. David B. Kirk and Wen-mei W. Hwu. Programming Massively Parallel Processors: A Hands-On Approach (1st ed.). Elsevier India Pvt. Ltd. 2010.
4. Michael T. Heath. Scientific Computing: An Introductory Survey (2nd ed.). McGraw Hill Education (India) Private Limited

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Elective-IV Geographic Information System

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction to GIS Basic concepts: Definition and history, Components of GIS, Recent trends and applications of GIS; Data structure and formats, Spatial data models – Raster and vector, Data base design- editing and topology creation in GIS, Linkage between spatial and non-spatial data, Data inputting in GIS. Rectification, Transformation Methods; Root Mean Square (RMS) Error.

UNIT II: Data Types and Data Models Data Types; Spatial Data; Non-Spatial Data, Data Input; Existing GIS Data, Metadata; Conversion of Existing Data, Creating New Data, Data Models; Vector Data Model; Raster Data Model; Integration and Comparison of Vector and Raster Data Models

UNIT III: Spatial Data Editing Types of Digitizing Errors, Causes for Digitizing Errors; Topological Editing and Non-topological Editing; Other Editing Operations; Editing Using Topological Rules.

UNIT IV: Attribute Data and Data Exploration Attribute Data in GIS, Attribute Data Entry, Manipulation of Fields and Attribute Data, Data Exploration; Attribute Data Query, Raster Data Query, Map- Based Data Manipulation

UNIT V: Spatial Analysis Spatial Data: Definition, Analysis, Processes & Steps, Software and Tools, Geodatabase Model, Role of Databases in GIS, Creating, Editing and Managing, Classification scheme of Vector- Based and Raster- Based GIS Operation Raster- Based Techniques: Methods of reclassification, overlay analysis, Digital Terrain Analysis and Modeling- TIN and DEM, Surface representation and analysis, Slope and Aspect, Geographic Visualization Data Classification, Map Comparison

UNIT VI: Geo Statistical Analysis Techniques: Introduction to Spatial Interpolation: Control Points, Global Method- Trend surface analysis, regression model, local methods- Thiessen polygons, density estimation, Inverse Distance weighted Interpolation, Kriging- Ordinary Kriging and Universal Kriging, GIS and decision support system, Introduction to AHP, basic principal of AHP. Principal and components of multiple criteria decision making.

Text Books:

1. kang-tsung Chang (2007), 'Introduction to Geographic Information Systems' Tata MCGraw Hill, New Delhi.

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Reference Books:

1. C.P.Lo and Albert K.W. Yeung (2006) "Concepts and Techniques of Geographic information Systems" Prentice Hall of India, New Delhi
2. Burrough, Peter A. and Rachael McDonnell, (1998), 'Principles of Geographical Information Systems' Oxford University press, New York.
3. Magwire, D.J. Goodchild, M.F. and Rhind, D.M., (2005), 'Geographical Information Systems: Principles and Applications', Longman Group, U.K.
4. Burrough, P.A., 1986, Geographical Information System for land Resources System, Oxford Univ. Press, UK.
5. Fotheringham, S.; Rogerson, P. (ed.), 1994. Spatial analysis and GIS. Taylor and Francis, London, UK.
6. Laurini, Robert and Dierk Thompson, 1992, Fundamentals of Spatial Information Systems, Academics Press, ISBN 0-12-438380-7.
7. Maguire,D.J.; Goodchild, M.F.; Rhind,D.W. 1991.Geographical information System, Longman, London,UK
8. Siddiqui, M.A.; 2006, Introduction to Geographical Information System, Sharda Pustak Bhavan, Allahabad.
9. Siddiqui, M.A.; 2011, Concepts and Techniques of Geoinformatics, Sharda Pustak Bhavan, Allahabad.

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Elective-IV Block Chain Technology

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction: Scenarios, Challenges Articulated, Blockchain, Blockchain Characteristics, Opportunities Using Blockchain, History of Blockchain.
Evolution of Blockchain: Evolution of Computer Applications, Centralized Applications, Decentralized Applications, Stages in Blockchain Evolution, Consortia, Forks, Public Blockchain Environments, Type of Players in Blockchain Ecosystem, Players in Market.

UNIT II: Blockchain Concepts: Introduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on blockchain, data storage on blockchain, wallets, coding on blockchain: smart contracts, peer-to-peer network, types of blockchain nodes, risk associated with blockchain solutions, life cycle of blockchain transaction

UNIT III: Architecting Blockchain solutions: Introduction, Obstacles for Use of Blockchain, Blockchain Relevance Evaluation Framework, Blockchain Solutions Reference Architecture, Types of Blockchain Applications, Cryptographic Tokens, Typical Solution Architecture for Enterprise Use Cases, Types of Blockchain Solutions, Architecture Considerations, Architecture with Blockchain Platforms, Approach for Designing Blockchain Applications

UNIT IV: Ethereum Blockchain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts, MyEtherWallet, Ethereum Networks/Environments, Infura, Etherscan, Ethereum Clients, Decentralized Application, Metamask, Tuna Fish Use Case Implementation, OpenZeppelinContract

UNIT V: Hyperledger Blockchain Implementation: Introduction, Use Case — Car Ownership Tracking, Hyperledger Fabric, Hyperledger Fabric Transaction Flow, FabCar Use Case Implementation, Invoking Chaincode Functions Using Client Application

UNIT VI: Advanced Concepts in Blockchain: Introduction, InterPlanetary File System (IPFS), Zero-Knowledge Proofs, Oracles, Self-Sovereign Identity, Blockchain with 10T and Al/ML Quantum Computing and Blockchain, Initial Coin Offering, Blockchain Cloud Offerings, Blockchain and its Future Potential.

UNIT VII: Technical challenges, Business model challenges, Scandals and Public perception, Government Regulations, Uses of Block chain in E-Governance, Land Registration, Medical Information Systems.

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Text Books:

1. "Blockchain for Enterprise Application Developers", Ambadas, Arshad SarfarzAriff, Sham Wiley.

Reference Books:

1. "Mastering Bitcoin: Programming the Open Blockchain", Andreas M. Antonpoulos,O'Reilly
2. Blockchain: A Practical Guide to Developing Business, Law, and Technology Solutions, Joseph Bambara, Paul R. Allen, Mc GrawHill.
3. Blockchain: Blueprint for a New Economy, Melanie Swan,O'Reilly

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Elective-IV Secure Software Design

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Secure Software Design Identify software vulnerabilities and perform software security analysis, Master security programming practices, Master fundamental software security design concepts, Perform security testing and quality assurance.

UNIT II: Enterprise Application Development Describe the nature and scope of enterprise software applications, Design distributed N-tier software application, Research technologies available for the presentation, business and data tiers of an enterprise software application, Design and build a database using an enterprise database system, Develop components at the different tiers in an enterprise system, Design and develop a multi-tier solution to a prob

UNIT III: Enterprise Systems Administration Design, implement and maintain a directory-based server infrastructure in a heterogeneous systems environment, Monitor server resource utilization for system reliability and availability, Install and administer network services (DNS/DHCP/Terminal Services/Clustering/Web/Email).

UNIT IV: Enterprise Network Obtain the ability to manage and troubleshoot a network running multiple services, Understand the requirements of an enterprise network and how to go about managing them

UNIT V: Defending Applications Handle insecure exceptions and command/SQL injection, Defend web and mobile applications against attackers, software containing minimum vulnerabilities and flaws

Text Books:

1. Theodor Richardson, Charles N Thies, Secure Software Design, Jones & Bartlett.

Reference Books:

1. Kenneth R. van Wyk, Mark G. Graff, Dan S. Peters, Diana L. Burley, Enterprise Software Security, Addison Wesley

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Elective-IV Data Storage Technologies and Networks

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Storage Media and Technologies – Magnetic, Optical and Semiconductor Media, Techniques for read/write Operations, Issues and Limitations.

UNIT II: Usage and Access – Positioning in the Memory Hierarchy, Hardware and Software Design for Access, Performance issues

UNIT III: Large Storages – Hard Disks, Networked Attached Storage, Scalability issues, Networking issues

UNIT IV: Storage Architecture - Storage Partitioning, Storage System Design, Caching, Legacy Systems

UNIT V: Storage Area Networks – Hardware and Software Components, Storage Clusters/Grids. Storage QoS– Performance, Reliability and Security issues

Text Books:

1. The Complete Guide to Data Storage Technologies for Network-centric Computing Paperback– Import, Mar 1998 by Computer Technology Research Corporation

Reference Books:

1. Data Storage Networking: Real World Skills for the CompTIA Storage by Nigel Poulton

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Elective-IV INFORMATION RETRIEVAL SYSTEMS

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction to Information Retrieval: Motivation, Information Retrieval vs Data Retrieval, Domain Analysis of IR systems, The retrieval process. **Introduction to Data Structures and Algorithms related to Information Retrieval**: Basic Concepts, Data structures, Algorithms.**IR System Evaluation**: Recall and Precision, Alternative Measures, Reference Collections and Evaluation of IR systems.

UNIT II: Modelling: Classic information retrieval models- Boolean Model, Vector Space Model, Probabilistic Model, Alternative Models, and Comparison

UNIT III: Query Languages for IR: Introduction, Key words based: Single word, Boolean Queries, Context Queries, Natural Language Queries, Structural Queries

UNIT IV: Text Processing: Document Processing, Text Comparison.
Stemming Algorithms: Introduction, Types of Stemming Algorithms, Experimental Evaluations of Stemming to Compress Inverted Files
Thesaurus Construction: Introduction, Features of Thesauri, Thesaurus Construction, Thesaurus construction from Texts, Merging existing Thesauri

UNIT V: Indexing: Introduction, Inverted files, PAT Trees, Signature files.
Inverted files- Introduction, Structures used in Inverted Files, Building Inverted file using a sorted array, Modifications to Basic Techniques.

UNIT VI: New Indices for Text: PAT Trees and PAT Arrays: Introduction, PAT Tree structure, algorithms on the PAT Trees, Building PAT trees as PATRICA Trees, PAT representation as arrays

UNIT VII: Signature Files: Introduction, Concepts of Signature Files, Compression, Vertical Partitioning, Horizontal Partitioning

Text Books:

1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992..

Reference Books:

1. Modern Information Retrieval by Yates Pearson Education.
2. Information Storage & Retrieval by Robert Korfhage – John Wiley & Sons Kowalski, Gerald, Mark T Maybury: Information Retrieval Systems: Theory and Implementation, Kluwer Academic Press, 1997.
3. Information retrieval Algorithms and Heuristics, 2ed, Springer

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MACHINE LEARNING LAB

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 50 Marks	**External: 50 Marks**	**Total: 100 Marks**

List of Experiments:

1. Implement Principal Component Analysis (PCA) and Singular Value Decomposition (SVD) using NumPy
2. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
3. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.
4. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
5. Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.
6. Write a program to implement the naïveBayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
7. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.
8. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.
9. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.

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10. Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.
11. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.
12. Create the following plots using Matplotlib, Pandas Visualization, Seaborn on iris dataset, wine reviews datasets.
    a) Scatter Plot
    b) Line chart
    c) Histogram
    d) Heatmap

Text Books:

1. Hands–On Machine Learning with Scikit–Learn and TensorFlow 2e: Concepts, Tools, and Techniques to Build Intelligent Systems, AurelienGeron, 2019.

Reference Books:

1. https://scikit-learn.org/stable/tutorial/index.html
2. https://archive.ics.uci.edu/ml/index.php
3. https://towardsdatascience.com/pca-and-svd-explained-with-numpy-5d13b0d2a4d8
4. https://towardsdatascience.com/introduction-to-data-visualization-in-python-89a54c97fbed

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Annexure-XXXVI

Data Visualization using Tableau Lab

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 2**
Internal: 50 Marks	**External: 50 Marks**	**Total: 100 Marks**

List of Experiments:

Module 1: Tableau Course Material

- Start Page
- Show Me
- Connecting to Excel Files
- Connecting to Text Files
- Connect to Microsoft SQL Server
- Connecting to Microsoft Analysis Services
- Creating and Removing Hierarchies
- Bins
- Joining Tables
- Data Blendin

Module 2: Learn Tableau Basic Reports

- Parameters
- Grouping Example 1
- Grouping Example 2
- Edit Groups
- Set
- Combined Sets
- Creating a First Report
- Data Labels
- Create Folders
- Sorting Data
- Add Totals, Sub Totals and Grand Totals to Report

Module 3: Learn Tableau Charts

- Area Chart
- Bar Chart
- Box Plot
- Bubble Chart
- Bump Chart
- Bullet Graph
- Circle Views
- Dual Combination Chart

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- Dual Lines Chart
- Funnel Chart
- Traditional Funnel Charts
- Gantt Chart
- Grouped Bar or Side by Side Bars Chart
- Heatmap
- Highlight Table
- Histogram
- Cumulative Histogram
- Line Chart
- Lollipop Chart
- Pareto Chart
- Pie Chart
- Scatter Plot
- Stacked Bar Chart
- Text Label
- Tree Map
- Geographic map

Module 4: Custom SQL

- Convert to Custom SQL

Module 5: Learn Tableau Advanced Reports

- Dual Axis Reports
- Blended Axis
- Individual Axis
- Add Reference Lines
- Reference Bands
- Reference Distributions
- Basic Maps
- Symbol Map
- Use Google Maps

Module 6: Learn Tableau Calculations & Filters

- Calculated Fields
- Basic Approach to Calculate Rank
- Advanced Approach to Calculate Rank
- Calculating Running Total
- Filters Introduction
- Quick Filters
- Filters on Dimensions

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- Conditional Filters
- Top and Bottom Filters
- Filters on Measures
- Context Filters
- Slicing Filters
- Data Source Filters
- Extract Filters

Module 7: Learn Tableau Dashboards

- Create a Dashboard
- Format Dashboard Layout
- Create a Device Preview of a Dashboard
- Create Filters on Dashboard
- Dashboard Objects
- Create a Story

Module 8: Tableau data server

- Physical architecture overview
- User access
- Component functions & processes
- Tableau server on-premises
- Tableau reader
- Tableau online v tableau server

Module 9: Tableau Server UI

- Tableau server user interface
- Users
- Site roles
- Groups
- Schedules
- Tasks
- Tableau server menu
- Content display options

Text Books:

1. Fundamentals of Data Visualization, Claus O. Wilke, O'Reilly
2. Tableau Data Visualization Cookbook, Ashutosh Nandeshwar, Packt Publishing

Reference Links:

1. https://archi ableau Data Visualization Cookbook ve.ics.uci.edu/ml/index.php
2. https://www.coursera.org/specializations/data-visualization

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Research Methodology & IPR

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 2**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

Unit 1: Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations.

Unit 2: Effective literature studies approaches, analysis Plagiarism, Research ethics

Unit 3: Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

Unit 4: Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

Unit 5: Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

Unit 6: New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.

Reference Books:

1. Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science& engineering students'"
2. Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"
3. Ranjit Kumar, 2 ndEdition, "Research Methodology: A Step by Step Guide for beginners"
4. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd,2007.
5. Mayall, "Industrial Design", McGraw Hill, 1992.
6. Niebel, "Product Design", McGraw Hill, 1974.
7. Asimov, "Introduction to Design", Prentice Hall, 1962.
8. Robert P. Merges, Peter S. Menell, Mark A. Lemley, "Intellectual Property in New Technological Age", 2016.
9. T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008

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Visakhapatnam

Organizational Behavior (Audit Course)

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 0**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Organizational Behavior: Concept of Organization - Concept of Organizational Behavior - Nature of Organizational Behavior - Role of Organizational behavior - Disciplines contributing to Organizational Behavior.

UNIT II: Motivation: Definition - Nature of Motivation - Role of Motivation - Theories of Motivation: Maslow's Need Hierarchy Theory, Herzberg's Motivation Hygiene Theory and McGregor's Theory X and Theory Y.

UNIT III: Group Dynamics: Meaning - Concept of Group - Types of groups -Formal and Informal groups - Group development - Group cohesiveness and factors affecting group cohesiveness

UNIT IV: Leadership: Concept of Leadership - Difference between Leadership and Management - Importance of Leadership - Leadership styles: Autocratic leadership, Participative leadership and Free Rein leadership.

UNIT V: Communication: Meaning - Communication Process - Forms of communication: Oral, Written and Non- Verbal communication - Direction of communication: Downward, Upward and Horizontal communication.

UNIT VI: Organizational conflicts: Concept of conflict - Reasons for conflict - Types of Conflict:Intrapersonal conflict, Interpersonal conflict, Intragroup conflict, Intergroup conflict, Inter organizational conflict - Conflict management.

UNIT VII: Organizational Change: Nature - Factors in Organizational change -Planned change: Process of planned change - Resistance to change: Factors in resistance to change – Overcoming resistance to change.

Text Books:

1. L.M.Prasad: Organizational Behavior, Sultan Chand & Sons, New Delhi -110002.

Reference Books:

1. K. Aswathappa: Organizational Behavior, Himalaya Publishing House, New Delhi.
2. Stephen Robbins: Organizational Behavior, Pearsons Education, New Delhi.

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ENTREPRENEURSHIP (AUDIT COURSE)

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 0**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Basic Concepts of Management: Definition, Nature and Importance ; Functions of the Management; Levels of Management; F.W Taylor's Scientific Management; Henry Fayol's Principles of Management.

UNIT II: Forms of Business Organizations: Introduction, Types of Business organizations: Private Sector- Individual Ownership , Partnership, Joint stock companies and Co-Operative organizations; Public sector- Departmental Organizations, Public Corporations and Government Companies; The Joint sector Management

UNIT III: Production and operations Management: Plant location- Factors to be considered in the selection of Plant location; Break - even analysis- Significance and managerial applications; Importance of Production Planning and Control and its Functions; Human Resource Management and Functions of Human Resource Manager (in brief); Functions of Marketing; Methods of Raising Finance

UNIT IV: Entrepreneurship: Definition, Characteristics and Skills , Types of Entrepreneurs, Entrepreneur vs. Professional Managers, , Growth of Entrepreneurs, Nature and Importance of Entrepreneurs, Women Entrepreneurs, Problems of Entrepreneurship.

UNIT V: Entrepreneurial Development and Project Management: Institutions in aid of Entrepreneurship Development, Idea generation: Sources and Techniques;, Stages in Project formulation ; Steps for starting a small enterprise - Incentives for Small Scale Industries by Government

Text Books:

1. Sharma,S.C, and Banga, T.R., Industrial Organization & Engineering Economics, Khanna Publishers, Delhi, 2000.

Reference Books:

1. VasantDesai ,The Dynamics of Entrepreneurial Development and Management (Planning for future Sustainable growth),HImalayan Publishing House, 2018
2. Aryasri , A.R., Management Science, McGraw HIll Education (India Private Limited , New Delhi 2014.
3. Sheela, P. , and JagadeswaraRao, K., Entrepreneurship, Shree Publishing House, Guntur

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GVP COLLEGE OF ENGINEERING FOR WOMEN
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

M.Tech -VLSI DESIGN & EMBEDDED SYSTEMS
Course Structure and Scheme of Valuation w.e.f. 2024-25 admitted batch

I SEMESTER

Code	Name of the subject	Periods/week		Max. Marks		Total	Credits
		Theory	Lab	Ext.	Int.		
24EC21RC01	Analog and Digital CMOS VLSI Design	3	-	70	30	100	3
24EC21RC02	Embedded Systems Design	3	-	70	30	100	3
24EC21PE01	Elective-I	3	-	70	30	100	3
24EC21PE02	Elective-II	3	-	70	30	100	3
24HM21AC01	Research Methodology &IPR	2	-	70	30	100	2
24HM21AC02	Organizational Behavior (Audit Course)	3	-	-	100	100	0
24EC21RC03	Analog and Digital CMOS VLSI Design Lab	-	3	50	50	100	1.5
24EC21RC04	Embedded system Design Lab	-	3	50	50	100	1.5
	Total	**17**	**6**	**450**	**350**	**800**	**17**

Elective-I: Application Specific Integrated Circuit (ASIC)/ Advanced Operating Systems/ Parallel Processing

Elective II: CPLD and FPGA Architectures & Applications / Electronic Design Automation Tools/ Digital System Design

II SEMESTER

Code	Name of the subject	Periods/week		Max. Marks		Total	Credits
		Theory	Lab	Ext.	Int.		
24EC21RC05	RTL Design & Verification using System Verilog	3	-	70	30	100	3
24EC21RC06	Internet of Things and its Applications	3	-	70	30	100	3
24EC21PE03	Elective-III	3	-	70	30	100	3
24EC21PE04	Elective-IV	3	-	70	30	100	3
24HM21AC03	Entrepreneurship (Audit course)	3	-	-	100	100	0
24EC21RC07	RTL Design & Verification using System Verilog Lab	-	3	50	50	100	1.5
24EC21RC08	Internet of Things and its Applications Lab	-	3	50	50	100	1.5
24EC21PR01	Mini Project with Seminar	-	4	-	100	100	2
	Total	**15**	**10**	**380**	**420**	**800**	**17**

Elective III: Low Power VLSI Design/ System on Chip Design/ Digital Signal and Image Processing

Elective IV: Communication Buses and Interfaces / Design for Testability/ DSP Processors and Architectures

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ANNEXURE - IX

ANALOG AND DIGITAL CMOS VLSI DESIGN
I Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Understand the concepts of MOS Devices and Modeling
CO2:	Analyze the CMOS sub circuits
CO3:	Illustrate the concepts of MOS Design and compare the characteristics of a Psuedo-nMOS and CMOS Inverter.
CO4:	Design and analysis of Combinational Circuits using NMOS logic, CMOS logic and Transmission gate logic.
CO5:	Design and analysis of Sequential Circuits using nMOS logic, CMOS logic and Transmission gate logic.

UNIT-I

Technology Scaling and Road map, Scaling issues, Standard 4 mask NMOS Fabrication process

Digital CMOS Design:

Basic MOS structure and its static behavior, Quality metrics of a digital design: Cost, Functionality, Robustness, Power, and Delay, Stick diagram and Layout, Wire delay models. Inverter: Static CMOS inverter, Switching threshold and noise margin concepts and their Evaluation, Dynamic behavior, Power consumption.

UNIT-II

Physical design flow

Floor planning, Placement, Routing, CTS, Power analysis and IR drop estimation-static and dynamic, ESD protection-human body model, Machine model. Combinational logic: Static CMOS design, Ratioed logic, Pass transistor logic, Dynamic logic, Speed and power dissipation in dynamic logic, Cascading dynamic gates, CMOS transmission gate logic.

UNIT-III

Sequential logic

Static latches and registers, Bi-stability principle, MUX based latches, Static SR flip-flops, Master-slave edge-triggered register, Dynamic latches and registers, Concept of pipelining, ulse registers, non-bistable sequential circuit. Advanced technologies: Giga-scale dilemma, short channel effects, High–k, Metal Gate Technology, FinFET, TFET etc.

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UNIT-IV
Analog CMOS Design: Single Stage Amplifier CS stage with resistance load, Divide connected load, Current source load, Triode load, CS stage with source degeneration, Source follower, Common gate stage, Cascade stage, Choice of device models. Differential Amplifiers: Basic difference pair, Common mode response, Differential pair with MOS loads, Gilbert cell.

UNIT-V
Passive and active current mirrors Basic current mirrors, Cascade mirrors, Active current mirrors. Frequency response of CS stage: Source follower, Common gate stage, Cascade stage and difference pair, Noise. Operational amplifiers: One stage OPAMP.

Text Books:
1. J P Rabaey, A P Chandrakasan, B Nikolic, "Digital Integrated circuits: A design perspective", Prentice Hall electronics and VLSI series, 2nd Edition. 2. Baker, Li, Boyce, "CMOS Circuit Design, Layout, and Simulation", Wiley, 2nd Edition. 3. Behzad Razavi, "Design of Analog CMOS Integrated Circuits", TMH, 2007.
Reference Books:
1. Phillip E. Allen and Douglas R. Holberg, "CMOS Analog Circuit Design", Oxford, 3rd Edition. 2. R J Baker, "CMOS circuit Design, Layout and Simulation", IEEE Inc., 2008. 3. Kang, S. and Leblebici, Y., "CMOS Digital Integrated Circuits, Analysis and Design", TMH, 3rdEdition. 4. Pucknell, D.A. and Eshraghian, K., "Basic VLSI Design", PHI, 3rd Edition.

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ANNEXURE - X

EMBEDDED SYSTEMS DESIGN
I Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Analyze the quality principles and tools in embedded system during product development process and Design interface circuit with processor and memory devices.
CO2:	Understand the architectural and programming concepts of ARM controllers.
CO3:	Compare and select ARM processor core based SoC with several features/peripherals based on requirements of embedded applications.
CO4:	Develop software programs to control embedded system using C
CO5:	Develop software programs to control embedded system using Python Languages.

UNIT-I

Introduction to Embedded Electronic Systems and Microcontrollers:
An Embedded System-Definition, Embedded System Design and Development Life Cycle, An Introduction to Embedded system Architecture, The Embedded Systems Model, Embedded Hardware: The Embedded Board and the von Neumann Model, Embedded Processors: ISA Architecture Models, Internal Processor Design, Processor Performance, Board Memory: Read-Only Memory (ROM), Random-Access Memory (RAM), Auxiliary Memory, Memory Management of External Memory and Performance, Approaches to Embedded Systems, Small Microcontrollers, Anatomy of a Typical Small Microcontroller, Small Microcontrollers Memory, Embedded Software

UNIT-II

ARM Embedded Systems
The RISC Design Philosophy, The ARM Design Philosophy, Embedded System Hardware, Embedded System Software, ARM processor Families, Core extensions, Architecture Revisions.

UNIT-III

ARM Cortex-M3 processor: Applications, Programming model – Registers, Operation modes, Exceptions and Interrupts, Reset Sequence Instruction Set, Unified Assembler Language,
Memory Maps, Memory Access Attributes, Permissions, Bit-Band Operations, Unaligned and Exclusive Transfers. Pipeline, Bus Interfaces

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UNIT-IV

Embedded C

Introduction to Embedded C - Difference between C & Embedded C - Programming style - Basic structure of C program- Keywords & Identifiers - Data type & its memory representation - Arrays and strings- Types of Operators - Bitwise Operators - Control Structures – Loops - Functions.

UNIT-V

Python Programming

Basics of PYTHON Programming Syntax and Style – Python Objects– Dictionaries – comparison with C programming on Conditionals and Loops – Files – Input and Output – Errors and Exceptions – Functions – Modules – Classes and OOP – Execution Environment.

Text Books:

1. Tammy Noergaard "Embedded Systems Architecture: A Comprehensive Guide for Engineers and Programmers", Elsevier (Singapore) Pvt. Ltd. Publications, 2005.
2. David. E. Simon, "An Embedded Software Primer", Pearson Education, 2001.
3. Rajkamal, "Embedded Systems: Architecture, Programming and Design", TMH Publications, Second Edition, 2008.
4. Joseph Yiu, "The definitive guide to ARM Cortex-M3", Elsevier, 2nd Edition

Reference Books:

1 Michael J Pont, "Embedded C", Pearson Education, 2007.
2. Jivan S. Parab, Vinod G. Shelake, Rajanish K.Kamot, and Gourish M.Naik, "Exploring C for Microcontrollers- A Hands on Approach", Springer, 2007.
3. Mark Lutz, "Learning Python Powerful OOPs",O'reilly,2011.
4. Peter Barry, Patrick Crowley, "Modern Embedded Computing" Morgan Kaufmann Publishers, 2012.
5. Sloss Andrew N, Symes Dominic, Wright Chris, "ARM System Developer's Guide: Designing and Optimizing", Morgan Kaufman Publication

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ANNEXURE - XI

Elective I
APPLICATION SPECIFIC INTEGRATED CIRCUITS (ASIC)
I Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Architect ASIC library design
CO2:	Develop programmable ASIC logic cells
CO3:	Design I/O cells and interconnects
CO4:	Identify new developments in SOC and low power design.
CO5:	design cell design

UNIT-I

Introduction to ASICs – Types of ASICs, Design flow, Economics of ASICs, ASIC Cell Libraries, CMOS Logic, CMOS Design Rules, Logic Cells, I/O Cells, Cell Compilers.

UNIT-II

ASIC Library Design – Transistors as resistors, Transistor Parasitic Capacitance, Logical Effort, Cell Design, Programmable ASICs, Programmable ASIC Logic Cells, Programmable ASIC I/O Cells, Programmable ASIC Interconnect, Programmable ASIC Design Software.

UNIT-III

Low-level Design Entry, Schematic Entry, Low-Level Design Languages, PLA Tools, EDIF, An overview of VHDL and Verilog, Logic Synthesis, Simulation. ASIC Construction, Floor Planning and Placement.

UNIT-IV

CMOS System Core Studies: Dynamic Warp Processors: Introduction, The Problem, The Algorithm, A Functional Overview, Detailed Functional Specification, Structural Floor Plan, Physical Design, Fabrication, Hierarchical Layout and Design Of Single Chip 32 Bit CPU: Introduction, Design Methodology, Technology Updatability And Layout Verification.

UNIT-V

Practical Realities and Ground Rules: Further Thoughts on Floor Plans/Layout, Floor Plan Layout of The Four Bit Processors, Input/output (I/O) Pads, "Real estate", Further Thoughts on System Delays, Ground Rules for Successful Design, Scaling of MOS Circuits.

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Text Books:
1.Application Specific Integrated Circuits by J.S. Smith, Addison Wesley, 1997.
Reference Books:
1.Basic VLSI Design : Systems and Circuits, Doublas A. Pucknell& Kamran Eshraghian, Prentice Hall of India Private Ltd., New Delhi, 1989. 2. VLSI Design Techniques for analog and digital circuits, R.L. Geiger, P.E. Allen & N.R. Streder, McGraw Hill Int. 1990.

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ANNEXURE - XII

Elective I
ADVANCED OPERATING SYSTEMS
I Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Understand the objectives of computer system architecture, instruction execution, I/O functions, memory hierarchy, and operating system.
CO2:	Apply basic commands, I/O redirection, filters, editors, and shell operations in a Unix/Linux environment.
CO3:	Understand the concept of system calls, process management, and inter-process communication techniques like pipes, semaphores, and sockets.
CO4:	Outline the goals, design issues, and communication models in distributed systems.
CO5:	Apply synchronization techniques and deadlock management strategies in distributed systems.

UNIT-I

Introduction to Operating Systems
Overview of computer system hardware, Instruction execution, I/O function, Interrupts, Memory hierarchy, I/O Communication techniques, Operating system objectives and functions, Evaluation of operating System.

UNIT-II

Introduction to UNIX and LINUX
Basic Commands & Command Arguments, Standard Input, Output, Input / Output Redirection, Filters and Editors, Shells and Operations.

UNIT-III

System Calls: System calls and related file structures, Input / Output, Process creation & termination.
Inter Process Communication: Introduction, File and record locking, Client – Server example, Pipes, FIFOs, Streams & Messages, Name Spaces, Systems V IPC, Message queues, Semaphores, Shared Memory, Sockets & TLI.

UNIT-IV

Introduction to Distributed Systems:
Goals of distributed system, Hardware and software concepts, Design issues.
Communication in Distributed Systems:
Layered protocols, ATM networks, Client - Server model, Remote procedure call and Group communication.

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UNIT-V
Synchronization in Distributed Systems: Clock synchronization, Mutual exclusion, E-tech algorithms, Bully algorithm, Ring algorithm, Atomic transactions **Deadlocks:** Dead lock in distributed systems, distributed dead lock prevention and distributed dead lock detection.

Text Books:
1.The Design of the UNIX Operating Systems – Maurice J. Bach, 1986, PHI. 2. Distributed Operating System - Andrew. S. Tanenbaum, 1994, PHI. 3. The Complete Reference LINUX – Richard Peterson, 4th Ed., McGraw – Hill.
Reference Books:
1.Operating Systems: Internal and Design Principles - Stallings, 6th Ed., PE. 2. Modern Operating Systems - Andrew S Tanenbaum, 3rd Ed., PE. 3. Operating System Principles - Abraham Silberchatz, Peter B. Galvin, Greg Gagne, 7th Ed., John Wiley 4. UNIX User Guide – Ritchie & Yates. 5. UNIX Network Programming - W.Richard Stevens, 1998, PHI.

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ANNEXURE - XIII

Elective I
PARALLEL PROCESSING
I Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Outline the concepts of parallel processing and pipelining systems.
CO2:	Classify pipelining processors and illustrate advanced pipelining techniques.
CO3:	Build various architectures for VLIW processors.
CO4:	Make use of latency hiding techniques for implementing multithreaded processors
CO5:	Analyze parallel programming techniques and operating systems for multiprocessors customizing applications.

UNIT-I
Overview of Parallel Processing and Pipelining, Performance analysis, Scalability.

UNIT-II
Principles and implementation of Pipelining, Classification of pipelining processors, Advanced pipelining techniques, Software pipelining.

UNIT-III
VLIW processors Case study: Superscalar Architecture- Pentium, Intel Itanium Processor, Ultra PARC, MIPS on FPGA, Vector and Array Processor, FFT Multiprocessor Architecture.

UNIT-IV
Multithreaded Architecture, Multithreaded processors, Latency hiding techniques, Principles of Multithreading, Issues and solutions.

UNIT-V
Parallel Programming Techniques: Message passing program development, Synchronous and asynchronous message passing, Shared Memory Programming, Data Parallel Programming, Parallel Software Issues. Operating systems for multiprocessors systems Customizing applications on parallel processing platforms

Text Books:
1. Kai Hwang, Faye A. Briggs, "Computer Architecture and Parallel Processing", MGH International Edition

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2. Kai Hwang, "Advanced Computer Architecture", TMH
3. V. Rajaraman, L. Sivaram Murthy, "Parallel Computers", PHI.

Reference Books:

1. William Stallings, "Computer Organization and Architecture, Designing for performance "Prentice Hall, Sixth edition
2. Kai Hwang, ZhiweiXu, "Scalable Parallel Computing", MGH
3. David Harris and Sarah Harris, "Digital Design and Computer Architecture", Morgan

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ANNEXURE - XIV

Elective II
CPLD AND FPGA ARCHITECTURES AND APPLICATIONS
I Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Understand the features and architectures of industrial CPLDs with different families.
CO2:	Understand the features and architectures of industrial FPGAs with different families.
CO3:	Know the programming techniques used in FPGA design methodology.
CO4:	Design and implement complex real time digital circuits.
CO5:	Analyze the behavior of Integrated digital applications

UNIT-I

Introduction to Programmable Logic Devices

Introduction, Simple Programmable Logic Devices – Read Only Memories, Programmable Logic Arrays, Programmable Array Logic, Programmable Logic Devices/Generic Array Logic; Complex Programmable Logic Devices – Architecture of Xilinx Cool Runner XCR3064XL CPLD, CPLD Implementation of a Parallel Adder with Accumulation.

UNIT-II

Field Programmable Gate Arrays

Organization of FPGAs, FPGA Programming Technologies, Programmable Logic Block Architectures, Programmable Interconnects, Programmable I/O blocks in FPGAs, Dedicated Specialized Components of FPGAs, Applications of FPGAs.

UNIT-III

SRAM Programmable FPGAs

Introduction, Programming Technology, Device Architecture, The Xilinx XC2000, XC3000 and XC4000 Architectures.

UNIT-IV

Anti-Fuse Programmed FPGAs

Introduction, Programming Technology, Device Architecture, The Actel ACT1, ACT2 and ACT3 Architectures.

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UNIT-V
Design Applications General Design Issues, Counter Examples, A Fast Video Controller, A Position Tracker for a Robot Manipulator, A Fast DMA Controller, Designing Counters with ACT devices, Designing Adders and Accumulators with the ACT Architecture.

Text Books:
1. Field Programmable Gate Array Technology - Stephen M. Trimberger, Springer International Edition. 2. Digital Systems Design - Charles H. Roth Jr, Lizy Kurian John, Cengage Learning.
Reference Books:
1. Field Programmable Gate Arrays - John V. Oldfield, Richard C. Dorf, Wiley India. 2. Digital Design Using Field Programmable Gate Arrays - Pak K. Chan/Samiha Mourad, Pearson Low Price Edition. 3. Digital Systems Design with FPGAs and CPLDs - Ian Grout, Elsevier, Newnes. 4. FPGA based System Design - Wayne Wolf, Prentice Hall Modern Semiconductor Design Series.

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ANNEXURE - XV

Elective II
ELECTRONIC DESIGN AUTOMATION TOOLS
I Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Design software system models in a suitable system-level modeling language
CO2:	Make use of functional models into hardware and software components
CO3:	Construct models Using effective optimization techniques
CO4:	Compare the complexity and efficiency of various algorithms at high level and low level
CO5:	Analyze the behaviour of Mixed signal Digital Applications

UNIT-I

IMPORTANT CONCEPTS IN VERILOG:
Basics Of Verilog Language, Operators, Hierarchy, Procedures and Assignments, Timing Controls and Delay. Tasks And Functions Control Statements, Logic-Gate Modeling, Modeling Delay, Altering Parameters, other Verilog Features.

UNIT-II

SYNTHESIS AND SIMULATION USING HDLS:
Verilog And Logic Synthesis. VHDL And Logic Synthesis, Memory Synthesis, FSM Synthesis, Memory Synthesis, Performance-Driven Synthesis.
Simulation-Types of Simulation, Logic Systems Working of Logic Simulation, Cell Models, Delay Models State Timing Analysis, Formal Verification, Switch-Level Simulation Transistor-Level Simulation. CAD Tools For Synthesis and Simulation Model sim And Leonardo Spectrum (Exemplar).

UNIT-III

TOOLS FOR CIRCUIT DESIGN AND SIMULATION USING HSPICE:
HSPICE net list implementation,Hspice GUI for windows, DC and Operating point analysis,MOSFET behavioral modeling,Verilog-A modeule setup.

UNIT-IV

AN OVER VIEW OF MIXED SIGNAL VLSI DESIGN:
Fundamentals Of Analog and Digital Simulation, Mixed Signal Simulator Configurations, Understanding Modeling, Integration To CAE Environments, Analyses Of Analog Circuits Eg. A/D, D/A Converters, Up And Down Converters, Companders Etc.

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UNIT-V
TOOLS FOR LAYOUT IMPLEMENTATION: An overview of Schematic generation,DRC verification,LVS generation,PEX implementation,GDSII verification.

Text Books:
1. J.Bhaskar, A Verilog Primer, BSP, 2003. 2. J.Bhaskar, A Verilog HDL Synthesis BSP, 2003
Reference Books:
1. HSpice user guide simulation and Analysis 2. SABER: Technical Reference Manual, Analogy Nic, USA. 3. M.J.S.SMITH :Aplication-Specific Integrated Circuits(1997). Addison Wesley 4. "Digital VLSI Systems Design: A Design Manual for Implementation of Projects on FPGAs and ASICs Using Verilog" by Seetharaman Ramachandra.

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ANNEXURE - XVI

Elective II
DIGITAL SYSTEM DESIGN
I Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Apply CAMP algorithm for minimization of switching functions
CO2:	Make use of IISc and Compact algorithms in the development of minimized PLAs
CO3:	Develop Programmable Logic Devices using ASM charts
CO4:	Analyze various techniques for fault diagnosis in combinational circuits
CO5:	Analyze various techniques for fault diagnosis in sequential circuits

UNIT-I

Minimization Procedures and CAMP Algorithm

Review on minimization of switching functions using tabular methods, k-map, QM algorithm, CAMP-I algorithm, Phase-I: Determination of Adjacencies, DA, CSC, SSMs and EPCs,, CAMPI algorithm, Phase-II: Passport checking, Determination of SPC, CAMP-II algorithm: Determination of solution cube, Cube based operations, determination of selected cubes are wholly within the given switching function or not, Introduction to cube based algorithms.

UNIT-II

PLA Design, PLA Minimization and Folding Algorithms

Introduction to PLDs, basic configurations and advantages of PLDs, PLA-Introduction, Block diagram of PLA, size of PLA, PLA design aspects, PLA minimization algorithm (IISc algorithm), PLA folding algorithm (COMPACT algorithm)-Illustration of algorithms with suitable examples.

UNIT-III

Design of Large-Scale Digital Systems

Algorithmic state machine charts-Introduction, Derivation of SM Charts, Realization of SM Chart, control implementation, control unit design, data processor design, ROM design, PAL design aspects, digital system design approaches using CPLDs, FPGAs and ASICs.

UNIT-IV

Fault Diagnosis in Combinational Circuits

Faults classes and models, fault diagnosis and testing, fault detection test, test generation, testing process, obtaining a minimal complete test set, circuit under test methods- Path sensitization method, Boolean difference method, properties of Boolean differences, Kohavi algorithm, faults in PLAs, DFT schemes, built in self-test.

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UNIT-V
Fault Diagnosis in Sequential Circuits Fault detection and location in sequential circuits, circuit test approach, initial state identification, Haming experiments, synchronizing experiments, machine identification, distinguishing experiment, adaptive distinguishing experiments.

Text Books:
1. Logic Design Theory-N. N. Biswas, PHI 2. Switching and Finite Automata Theory-Z. Kohavi , 2nd Edition, 2001, TMH 3. Digital system Design using PLDd-Lala
Reference Books:
1. Fundamentals of Logic Design – Charles H. Roth, 5th Ed., Cengage Learning. 2. Digital Systems Testing and Testable Design – Miron Abramovici, Melvin A.Breuer and Arthur D. Friedman- John Wiley & Sons Inc.

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ANNEXURE - XVII

ANALOG AND DIGITAL CMOS VLSI DESIGN LAB

I Year M. Tech. I semester

(Branch: VLSI Design & Embedded Systems)

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Develop different Analog Applications
CO2:	Analyze the functional behaviour of analog circuits and determine performance metrics
CO3:	Develop different digital Applications
CO4:	Analyze the functional behaviour of digital circuits and determine performance metrics
CO5:	Construct layout and GDSII implementation of digital circuits

The students are required to design and implement the Circuit and Layout of any **TEN** Experiments using CMOS 130nm Technology with Mentor Graphics Tool/Cadence/ Synopsys/Industry Equivalent Standard Software.

List of Experiments:

1. MOS Device Characterization and parametric analysis
2. Common Source Amplifier
3. Cascode amplifier
4. Cascode current mirror.
5. Wilson current mirror.
6. Full Adder
7. RS-Latch
8. Clock Divider
9. JK-Flip Flop
10. Synchronous Counter
11. Asynchronous Counter
12. Static RAM Cell

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ANNEXURE - XVIII

EMBEDDED SYSTEMS DESIGN LAB

I Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Develop and execute Assembly Language Programs for arithmetic and bit manipulation on ARM Cortex M3.
CO2:	Interface and control hardware components like motors and DACs using Embedded C on an ARM Cortex M3 evaluation board.
CO3:	Utilize UART for serial communication and message display in Embedded C on ARM Cortex M3.
CO4:	Implement external interrupts to control LEDs and other outputs using Embedded C.
CO5:	Interface with sensors and read data using SPI ADC ICs on an ARM Cortex M3 evaluation board.

PART-A:

(Conduct the following experiments by writing Assembly Language Program (ALP) using ARM Cortex M3 Registers using an evaluation board/simulator and the required software tool.)

1. ALP to multiply two 16-bit binary numbers.
2. ALP to find the sum of first 10 integers.
3. ALP to find the number of 0's and 1's in a 32-bit data.
4. ALP to determine the given 16-bit number is ODD or EVEN.
5. ALP to write data in RAM.

PART-B:

(Conduct any **Five** experiments on an ARM CORTEX M3 evaluation board using evaluation version of Embedded 'C' &Keil Uvision-4tool/compiler.)

6. Display "Hello World" message using Internal UART.
7. Interface and Control a DC Motor.
8. Interface a Stepper motor and rotate it in clockwise and anti-clockwise direction.
9. Interface a DAC and generate Triangular and Square waveforms.
10. Interface a 4x4 keyboard and display the key code on an LCD.
11. Demonstrate the use of an external interrupt to toggle an LED On/Off.
12. Display the Hex digits 0 to F on a 7-segment LED interface, with an appropriate delay in between.
13. Measure Ambient temperature using a sensor and SPI ADC IC.

Beyond Syllabus:

1. Using the Internal PWM module of ARM controller generate PWM and vary its duty cycle.
2. Interface a simple Switch and display its status through Relay, Buzzer and LED.

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ANNEXURE - XIX

RTL DESIGN & VERIFICATION USING SYSTEM VERILOG

I Year M. Tech. II semester

(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Understand the importance of System Verilog
CO2:	Develop conditional constructs based digital applications using System Verilog
CO3:	Develop object oriented Programming(OOP) based digital applications
CO4:	Develop digital Applications using System Verilog
CO5:	Analyze functional coverage using System Verilog

UNIT-I

Introduction to System Verilog

Concepts of top-down design, Overview of RTL models, Overview of gate/switch models, The RTL design flow with simulation and synthesis, writing verification test benches in Verilog, running your preferred Verilog simulator, Debugging designs with simulation. Identifier names, Logic values and numbers, Data types and 2-state vs. 4-state guidelines, Enumerated types, User-defined types, Casting (Static and Dynamic). Structure and unions declarations and their element access. Dynamic arrays, Associative arrays, Queues and Strings

UNIT-II

System Verilog Interfaces, Packages and Compound types

Using interfaces to simplify inter-module connections, Mod ports in Interface, Clocking Blocking in interface, Transforming Verilog code into System Verilog using package, interface mod port and clocking block, Using tasks and functions in interfaces, Interfaces as an RTL modelling construct, Package declaration, Element access in package. System Verilog test bench using basic constructs, Program and Final block.

UNIT-III

System Verilog Procedural blocks and Assignments:

Procedural blocks, System Verilog enhanced procedural blocks, Blocking and non- blocking assignments, Continuous assignments, Programming statements – if else, case, case X, case Z, unique if, priority if, unique case, priority case. Operators and language rules, Loops: forever, for each, repeat, while do while and for loop.

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UNIT-IV

System Verilog Process Synchronization and OOPS

Fork—join variants for dynamic processes, Built-in mailbox classes, Built-in semaphore classes, Enhanced event data types, Test bench using mailbox, semaphores and event. System Verilog's class data type, defining class objects, Class methods, Class inheritance, Aggregate class, Abstraction class, Polymorphism, Virtual methods, Virtual classes, Public and private classes, Extending class definitions (inheritance), Virtual methods, Virtual classes, Public and private classes.

UNIT-V

System Verilog Constrained Random Value Generation, Functional Coverage and Assertions

Built-in System Verilog random classes, defining constrained random values, constrained random verification methodologies, system Verilog code coverage and functional coverage, Defining and constructing cover groups, Defining cover points and coverage bins, Coverage sampling, Cross coverage. Assertion concepts, Immediate and concurrent assertions, Assertion sequence definitions Testbench using constrained randomization, coverage. and Assertions

Text Books: 1."SystemVerilog for Design: A Guide to Using SystemVerilog for Hardware Design and Modeling" by Sutherland, Davidmann, and Flake.
2. "SystemVerilog Assertions and Functional Coverage: Guide to Language, Methodology and Applications" by Bergeron, Cerny, Hunter, and Nightingale

Reference Books:

1. "SystemVerilog Assertions Handbook: 2nd Edition" by Ben Cohen, Srinivasan Venkataramanan, and Ajeetha Kumari.
2. "SystemVerilog for Verification: A Guide to Learning the Testbench Language Features" by Chris Spear.
3. "A Practical Guide to Adopting the Universal Verification Methodology (UVM)" by Matt Rahl and Kathleen Meade.
4. "SystemVerilog Assertions Handbook: 4th Edition" by Ben Cohen, Srinivasan Venkataramanan, and Ajeetha Kumari.
5.SystemVerilog Unleashed" by Edmond Leung.
6. "SystemVerilog for Verification: A Guide to Learning the Testbench Language Features" by Chris Spear and Greg Tumbush.
7. "SystemVerilog for Verification: A Guide to Learning the Testbench Language Features" by Chris Spear, Greg Tumbush, and Cliff Cummings.

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ANNEXURE - XX

INTERNET OF THINGS AND ITS APPLICATIONS
I Year M. Tech. II semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art Internet of things
CO2:	Identify the architecture and infrastructure of IoT.
CO3:	Choose the appropriate technologies, algorithms, and approaches for the related issues.
CO4:	Identify problems, and explain, analyze, and evaluate various IoT solutions
CO5:	Explain the core issues of IoT such as security, privacy, and interoperability

UNIT-I

THE IoT NETWORKING CORE

History of IoT, Review of Technologies involved in IoT Development, Internet/Web and Networking Basics -OSI Model, Data transfer referred with OSI Model, IP Addressing, Point to Point Data transfer, Point to Multi Point Data transfer & Network Topologies, Sub-netting, Network Topologies referred with Web, Introduction to Web Servers, Introduction to Cloud Computing. Basics of Big Data, Data Science.

UNIT-II

IoT Architecture:

M2M – Machine to Machine, Web of Things, IoT protocols, Introduction to wireless and mobile networks, ZigBee, BLE mesh, WiFi, MQTT, LoRa-Machine Applications: Remote Monitoring & Sensing, Remote Controlling, Performance Analysis.

The Architecture

The Layering concepts , IoT Communication Pattern, IoT protocol Architecture, The 6LoWPAN

Security aspects in IoT

UNIT-III

IoT Platform overview

Overview of IoT supported Hardware platforms such as: Raspberry pi, ARM Cortex Processors, Arduino and Intel Galileo boards.

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Overview and working principle of Wired Networking equipment's – Router, Switches, Overview and working principle of Wireless Networking equipment's – Access Points, Hubs etc. Linux Network configuration Concepts: Networking configurations in Linux Accessing Hardware & Device Files interactions.

UNIT-IV

IoT Application Development:

Application Protocols

MQTT, REST/HTTP, CoAP, MySQL

Back-end Application Designing

Apache for handling HTTP Requests, PHP & MySQL for data processing, MongoDB Object type Database, HTML, CSS & jQuery for UI Designing, JSON lib for data processing, Security & Privacy during development, Application Development for mobile Platforms: Overview of Android / IOS App Development tools.

UNIT-V

CASE STUDIES/INDUSTRIAL APPLICATIONS

IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipment's. Use of Big Data and Visualization in IoT, Industry 4.0 concepts.

Text Books:

1. Jean-Philippe Vasseur, Adam Dunkels, "Interconnecting Smart Objects with IP: The Next Internet", Morgan Kuffmann-2010
2. Vijay Madisetti , ArshdeepBahga, : Internet of Things (A Hands-on-Approach)" -2014
3. Adrian McEwen (Author), Hakim Cassimally, "Designing the Internet of Things" ,Wiley - 2013
4. Dr. OvidiuVermesan, Dr. Peter Friess, "Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems," River Publishers -2013

Reference Books:

1. Barrie Sosinsky, "Cloud Computing Bible", Wiley-India, 2010
2. Asoke K Talukder and Roopa R Yavagal, "Mobile Computing," Tata McGraw Hill, 2010.
3. Adelstein and S.K.S. Gupta, "Fundamentals of Mobile and Pervasive Computing," McGraw Hill, 2009
4. Ronald L. Krutz, Russell Dean Vines "Cloud Security: A Comprehensive Guide to Secure Cloud Computing", Wiley-India, 2010

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ANNEXURE - XXI

Elective III
LOW POWER VLSI DESIGN
I Year M. Tech. II semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Illustrate the necessity of low power VLSI, Sources of power dissipation techniques and importance of Short-Channel effects
CO2:	Explain the concepts of Low-Power Design Approaches
CO3:	Analyze Low-Voltage Low-Power Adder Circuits
CO4:	Apply Low Power Design concept to Different Multiplier circuits
CO5:	Classify and Compare Low-Voltage Low-Power Memories

UNIT-I

Fundamentals of Low Power VLSI Design

Need for Low Power Circuit Design, Sources of Power Dissipation – Switching Power Dissipation, Short Circuit Power Dissipation, Leakage Power Dissipation, Glitching Power Dissipation, Short Channel Effects –Drain Induced Barrier Lowering and Punch Through, Surface Scattering, Velocity Saturation, Impact Ionization, Hot Electron Effect.

UNIT-II

Low-Power Design Approaches

Low-Power Design through Voltage Scaling – VTCMOS circuits, MTCMOS circuits, Architectural Level Approach –Pipelining and Parallel Processing Approaches.

Switched Capacitance Minimization Approaches

System Level Measures, Circuit Level Measures, Mask level Measures.

UNIT-III

Low-Voltage Low-Power Adders

Introduction, Standard Adder Cells, CMOS Adder's Architectures – Ripple Carry Adders, Carry Look-Ahead Adders, Carry Select Adders, Carry Save Adders, Low-Voltage Low-Power Design Techniques –Trends of Technology and Power Supply Voltage, Low-Voltage Low-Power Logic Styles.

UNIT-IV

Low-Voltage Low-Power Multipliers

Introduction, Overview of Multiplication, Types of Multiplier Architectures, Braun Multiplier, Baugh-Wooley Multiplier, Booth Multiplier, Introduction to Wallace Tree Multiplier.

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UNIT-V
Low-Voltage Low-Power Memories Basics of ROM, Low-Power ROM Technology, Future Trend and Development of ROMs, Basics of SRAM, Memory Cell, Precharge and Equalization Circuit, Low-Power SRAM Technologies, Basics of DRAM, Self-Refresh Circuit, Future Trend and Development of DRAM.

Text Books:
1. CMOS Digital Integrated Circuits – Analysis and Design – Sung-Mo Kang, Yusuf Leblebici, TMH, 2011. 2. Low-Voltage, Low-Power VLSI Subsystems – Kiat-Seng Yeo, Kaushik Roy, TMH Professional Engineering.
Reference Books:
1. Low Power CMOS Design – Anantha Chandrakasan, IEEE Press/Wiley International, 1998. 2. Low Power CMOS VLSI Circuit Design – Kaushik Roy, Sharat C. Prasad, John Wiley & Sons, 2000. 3. Practical Low Power Digital VLSI Design – Gary K. Yeap, Kluwer Academic Press, 2002. 4. Low Power CMOS VLSI Circuit Design – A. Bellamour, M. I. Elamasri, Kluwer Academic Press, 1995.

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ANNEXURE - XXII

Elective III
SYSTEM ON CHIP DESIGN
I Year M. Tech. II semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Illustrate System on Chip design architecture, Memory and Addressing
CO2:	Compare different processor architectures like VLIW and Superscalar
CO3:	Build SOC Memory system design, Types of cache and Memory interaction
CO4:	Analyze interconnect architectures and Reconfiguration technologies
CO5:	Examine different SOC design application case studies

UNIT-I

Introduction to the System Approach

System Architecture, Components of the system, Hardware & Software, Processor Architectures, Memory and Addressing. System level interconnection, An approach for SOC Design, System Architecture and Complexity.

UNIT-II

Processors

Introduction, Processor Selection for SOC, Basic concepts in Processor Architecture, Basic concepts in Processor Micro Architecture, Basic elements in Instruction handling. Buffers: minimizing Pipeline Delays, Branches, More Robust Processors, Vector Processors and Vector Instructions extensions, VLIW Processors, Superscalar Processors.

UNIT-III

Memory Design for SOC

Overview of SOC external memory, Internal Memory, Size, Scratchpads and Cache memory, Cache Organization, Cache data, Write Policies, Strategies for line replacement at miss time, Types of Cache, Split – I, and D – Caches, Multilevel Caches, Virtual to real translation, SOC Memory System, Models of Simple Processor – memory interaction.

UNIT-IV

Interconnect Customization and Configuration

Inter Connect Architectures, Bus: Basic Architectures, SOC Standard Buses, Analytic Bus Models, Using the Bus model, Effects of Bus transactions and contention time. SOC Customization: An overview, Customizing Instruction Processor, Reconfiguration Technologies, Mapping design onto Reconfigurable devices, Instance- Specific design, Customizable Soft Processor, Reconfiguration - overhead analysis and trade-off analysis on reconfigurable Parallelism.

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UNIT-V
Application Studies / Case Studies SOC Design approach, AES algorithms, Design and evaluation, Image compression – JPEG compression.

Text Books:
1. Computer System Design System-on-Chip - Michael J. Flynn and Wayne Luk, Wiely India Pvt. Ltd. 2. ARM System on Chip Architecture – Steve Furber –2nd Ed., 2000, Addison Wesley Professional.
Reference Books:
1. Design of System on a Chip: Devices and Components – Ricardo Reis, 1st Ed., 2004, Springer 2. Co-Verification of Hardware and Software for ARM System on Chip Design (Embedded Technology) – Jason Andrews – Newnes, BK and CDROM. 3. System on Chip Verification – Methodologies and Techniques –Prakash Rashinkar, Peter Paterson and Leena Singh L, 2001, Kluwer Academic Publishers.

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ANNEXURE - XXIII

Elective III
DIGITAL SIGNAL AND IMAGE PROCESSING
I Year M. Tech. II semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Analyze discrete-time signals and systems in various domains (i.e Time, Z and Fourier)
CO2:	Design the digital filters (both IIR and FIR) from the given specifications
CO3:	Analyze the quantization effects in digital filters and understand the basics of image sampling, quantization and image transforms.
CO4:	Understand the concepts of image enhancement, image restoration and image segmentation.
CO5:	Know the various methods involved in image compression and fundamentals in color image processing.

UNIT-I

Review of Discrete Time signals and systems, Characterization in time, Z and Fourier domain, Fast Fourier Transform using Decimation In Time (DIT) and Decimation In Frequency (DIF) Algorithms.

UNIT-II

IIR Digital Filters: Introduction, Analog filter approximations – Butter worth and Chebyshev, Design of IIR Digital filters from analog filters using Impulse Invariance, Bilinear Transformation methods.

FIR Digital Filters: Introduction, Design of FIR Digital Filters using Window Techniques, Frequency Sampling technique, Comparison of IIR & FIR filters.

UNIT-III

Analysis Of Finite Word length Effects: The Quantization Process and Errors, Quantization of Fixed-Point Numbers, Quantization of Floating-Point Numbers, Analysis of Coefficient Quantization effects.

Introduction To Digital Image Processing: Introduction, components in image processing system, Applications of Digital image processing, Image sensing and acquisition, Image sampling, Quantization, Basic Relationships between pixels, Image Transforms: 2D-DFT, DCT, Haar Transform.

UNIT-IV

Image Enhancement: Intensity transformation functions, histogram processing, fundamentals of spatial filtering, smoothing spatial filters, sharpening spatial filters, the basics of filtering in

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the frequency domain, image smoothing using frequency domain filters, Image Sharpening using frequency domain filters, Selective filtering.
Image Restoration: Introduction, restoration in the presence of noise only-Spatial Filtering, Periodic Noise Reduction by frequency domain filtering, Linear, Position –Invariant Degradations, Estimating the degradation function, Inverse filtering, Minimum mean square error (Wiener) filtering.
Image Segmentation: Fundamentals, point, line, edge detection, thresholding, region based segmentation.

UNIT-V

Image Compression: Fundamentals, Basic compression methods: Huffman coding, Arithmetic coding, Run-Length coding, Block Transform coding, Predictive coding, Wavelet coding.
Color Image Processing: color fundamentals, color models, pseudo color image processing, basics of full color image processing, color transformations, smoothing and sharpening. Image segmentation based on color, noise in color images, color image compression.

Text Books:

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G.Manolakis, Pearson Education/PHI,2007.
2. S. K. Mitra. "Digital Signal Processing – A Computer based Approach", TMH, 3rd Edition,2006 3. Rafael C.Gonzalez and Richard E. Woods, "Digital Image Processing", Pearson Education, 2011.
4. S.Jayaraman, S.Esakkirajan, T.Veerakumar, "Digital Image Processing", Mc Graw Hill Publishers, 2009

Reference Books:

1. Digital Signal Processing: Andreas Antoniou, TATA McGraw Hill , 2006
2. Digital Signal Processing: MH Hayes, Schaum's Outlines, TATA Mc-Graw Hill, 2007.
3. Anil K. Jain, "Fundamentals of Digital Image Processing," Prentice Hall of India, 2012.

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ANNEXURE - XXIV

Elective IV
COMMUNICATION BUSES AND INTERFACES
I Year M. Tech. II semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Compare serial buses like RS232, RS485, I2C, and SPI in terms of data rates, features, limitations, and applications.
CO2:	Understand CAN architecture, including ISO 11898 standards, data transmission, frame formats, and application layers.
CO3:	Outline PCIe revisions, configuration space, bus enumeration, hardware/software implementation, protocols, and applications.
CO4:	Understand USB transfer types, enumeration states, descriptor types, and device drivers.
CO5:	Learn about SFPDP configurations, flow control, and serial data transmission over fiber and copper cables.

UNIT-I
Serial Busses- Cables, Serial busses, serial versus parallel, Data and Control Signal- data frame, data rate, features Limitations and applications of RS232, RS485, I2C, SPI

UNIT-II
CAN **ARCHITECTURE**- ISO 11898-2, ISO 11898-3, Data Transmission- ID allocation, Bit timing, Layers- Application layers, Object layer, Transfer layer, Physical layer, Frame formats- Data frame, Remote frame, Error frame, Over load frame, Ack slot, Inter frame spacing, Bit spacing, Applications.

UNIT-III
PCIe Revision, Configuration space- configuration mechanism, Standardized registers, Bus enumeration, Hardware and Software implementation, Hardware protocols, Applications.

UNIT-IV
USB Transfer Types- Control transfers, Bulk transfer, Interrupt transfer, Isochronous transfer. Enumeration- Device detection, Default state, addressed state, Configured state, enumeration sequencing. Descriptor types and contents- Device descriptor, configuration descriptor, Interface descriptor, Endpoint descriptor, String descriptor. Device driver.

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UNIT-V
Data streaming Serial Communication Protocol- Serial Front Panel Data Port (SFPDP) configurations, Flow control, serial FPDP transmission frames, fiber frames and copper cable.

Text Books:
1. A Comprehensive Guide to controller Area Network – Wilfried Voss, Copperhill Media Corporation, 2nd Ed., 2005. 2. Serial Port Complete-COM Ports, USB Virtual Com Ports and Ports for Embedded Systems- Jan Axelson, Lakeview Research, 2nd Ed.,
Reference Books:
1. USB Complete – Jan Axelson, Penram Publications. 2. PCI Express Technology – Mike Jackson, Ravi Budruk, Mindshare Press.

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ANNEXURE - XXV

Elective IV
DESIGN FOR TESTABILITY
I Year M. Tech. II semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Outline the testing process and fault modelling
CO2:	Analyze different algorithms for true value and fault simulation
CO3:	Test circuits for SCOAP measures and list various scan design methods
CO4:	Analyze BIST process and types of BISTs
CO5:	Analyze fault coverage using ATPG techniques

UNIT-I

Introduction to Testing
Testing Philosophy, Role of Testing, Digital and Analog VLSI Testing, VLSI Technology Trends affecting Testing, Types of Testing, Fault Modeling: Defects, Errors and Faults, Functional Versus Structural Testing, Levels of Fault Models, Single Stuck-at Fault.

UNIT-II

Logic and Fault Simulation
Simulation for Design Verification and Test Evaluation, Modeling Circuits for Simulation, Algorithms for True-value Simulation, Algorithms for Fault Simulation.

UNIT-III

Testability Measures
SCOAP Controllability and Observability, High Level Testability Measures, Digital DFT and Scan Design: Ad-Hoc DFT Methods, Scan Design, Partial-Scan Design, Variations of Scan.

UNIT-IV

Built-In Self-Test
The Economic Case for BIST, Random Logic BIST: Definitions, BIST Process, Pattern Generation, Response Compaction, Built-In Logic Block Observers, Test-Per-Clock, Test-Per-Scan BIST Systems, Circular Self Test Path System, Memory BIST, Delay Fault BIST.

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UNIT-V
ATPG Single stuck at fault, Fault collapsing, ATPG Algorithm and Tetra-max tool flow,Fault models,Single stuck at operation,Delay fault model,Bridge Fault models,ATPG models, Fault classes,ATPG effectiveness,ATPG modes,Coverge and improvement techniques

Text Books:
1. Essentials of Electronic Testing for Digital, Memory and Mixed Signal VLSI Circuits - M.L. Bushnell, V. D. Agrawal, Kluwer Academic Publishers.
Reference Books:
1. Digital Systems and Testable Design - M. Abramovici, M.A.Breuer and A.D Friedman, Jaico Publishing House. 2. Digital Circuits Testing and Testability - P.K. Lala, Academic Press.

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ANNEXURE - XXVI

Elective IV
DSP PROCESSORS AND ARCHITECTURES
I Year M. Tech. II semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Understand DSP fundamentals and analyze computational accuracy and error sources in DSP implementations.
CO2:	Outline the basic architecture, computational blocks, memory, and external interfacing features of programmable DSP devices.
CO3:	Learn about the TMS320C54XX DSP's architecture, memory, instructions, peripherals, interrupts, and pipeline operation.
CO4:	Examine the Analog Devices DSP family, including ALU/MAC blocks, ADSP 2100, ADSP-2181, and Blackfin processor architecture.
CO5:	Analyze memory space organization, external bus interfacing, I/O methods, and DMA in programmable DSP devices.

UNIT-I

Introduction to Digital Signal Processing

Introduction, a Digital signal-processing system, the sampling process, discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time-invariant systems, Digital filters, Decimation and interpolation.

Computational Accuracy in DSP Implementations

Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT-II

Architectures for Programmable DSP Devices

Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation UNIT, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT-III

Programmable Digital Signal Processors

Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX Instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX Processors, Pipeline Operation of TMS320C54XX Processors.

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UNIT-IV
Analog Devices Family of DSP Devices Analog Devices Family of DSP Devices – ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP 2100, ADSP-2181 high performance Processor. Introduction to Black fin Processor - The Black fin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files, Address Arithmetic Unit, Control Unit, Bus Architecture and Memory, Basic Peripherals.

UNIT-V
Interfacing Memory and I/O Peripherals to Programmable DSP Devices Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA).

Text Books:
1. Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications, 2004. 2. A Practical Approach To Digital Signal Processing - K Padmanabhan, R. Vijaya rajeswaran, Ananthi. S, New Age International, 2006/2009 3. Embedded Signal Processing with the Micro Signal Architecture: Woon-Seng Gan, Sen M. Kuo, Wiley-IEEE Press, 2007
Reference Books:
1. Digital Signal Processors, Architecture, Programming and Applications-B. Venkataramani and M. Bhaskar, 2002, TMH. 2. DSP Processor Fundamentals, Architectures & Features – Lapsley et al. 2000, S. Chand & Co. 3. Digital Signal Processing Applications Using the ADSP-2100 Family by The Applications Engineering Staff of Analog Devices, DSP Division, Edited by Amy Mar, PHI 4. The Scientist and Engineer's Guide to Digital Signal Processing by Steven W. Smith, Ph.D., California Technical Publishing, ISBN 0-9660176-3-3, 1997.

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ANNEXURE - XXVII

RTL DESIGN & VERIFICATION USING SYSTEM VERILOG LAB

I Year M. Tech. II semester

(Branch: VLSI Design & Embedded Systems)

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Implementation of FSMs using System Verilog
CO2:	Transform Verilog RTL code to System verilog
CO3:	Design and Verify combinational digital applications using System Verilog
CO4:	Develop FIFO using conditional constructs
CO5:	Analyze the functional coverage for digital applications

List of Experiments:

1) Perform the following functions using System verilog
   a) Test all the 2-state and 4-state Data types.
   b) Design a 1010, 1011, 1110, and 1111 overlapped finite sequence, use enumerated data type, user defined data type and verify using system Verilog test-bench
   c) Declare structure and union, assign different values to the elements of structure and union, access the variables of the elements of the structure and unions using test-bench.
   d) Declare different arrays, assign values and test different access methods using test-bench.
   e) Declare a queue, assign values and test different access methods using test-bench.
2) Transform a Verilog RTL code to System Verilog code using packages, user defined data types, interface, mod port, clocking blocks.
3) Declare a program block and final block in a test-bench.
4) Design and verify the fixed priority arbiters using the following
   i) If – else
   ii) Case
   iii) Priority If
   iv) Priority Case

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5) Design and verify generic decoder using the following
   i) If – else
   ii) Case
   iii) Priority If
   iv) Priority Case
6) Design a Fibonacci series using loops and verify the same using test bench
7) Implementation of Priority based scheduler using System Verilog
8) Develop System-on-Chip (SoC) architecture
9) Develop a FIFO using the object-oriented programming
   i. Usage of Encapsulation and inheritance.
   ii. Modify the above developed test-bench using polymorphism.
10) Pick a scenario for each assertion type and execute.
   a. Modify the above test-bench to increase the functional coverage by using constrained random generation.
   b. Modify the above test-bench by writing specific assertions to enhance coverage further

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ANNEXURE - XXVIII

INTERNET OF THINGS AND ITS APPLICATIONS LAB
I Year M. Tech. II semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Understand Arduino, Node MCU, Raspberry Pi, and cloud services like Thingspeak and Blynk.
CO2:	Interface with ESP8266/Raspberry Pi to control LED blinking, switching, and intensity using PWM.
CO3:	Transmit LED and ultrasonic sensor data to cloud services via ESP8266/Raspberry Pi.
CO4:	Develop IoT projects such as temperature/humidity loggers and automatic plant watering systems.
CO5:	Create remote control systems for street lights and motion detectors with email notifications.

List of Experiments

1. Introduction to Arduino, Node MCU, Raspberry Pi and Cloud Service (Thingspeak, Blynk, …)
2. Blinking an LED by interfacing with ESP8266 / Raspberry Pi
3. Controlling an LED with a switch by interfacing with ESP8266 / Raspberry Pi
4. Change intensity of an LED using PWM by interfacing with ESP8266 / Raspberry Pi
5. Send LED status to a Cloud Service by interfacing with ESP8266 / Raspberry Pi
6. Send Ultrasonic Sensor Status to a Cloud Service by interfacing with ESP8266 / Raspberry Pi
7. IoT based Motor control by interfacing with ESP8266 / Raspberry Pi

Mini Projects

1. IoT based Temperature and Humidity logger using any Cloud Service
2. Remote Monitoring and Automatic Control of Street Lights
3. IoT based Automatic Plant Watering System
4. IoT based Motion detector with email Notification

Additional Experiments

1. Publishing sensor data to Google Spreadsheets
2. Photo capture and video streaming using Raspberry Pi

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ANNEXURE - XXIX

MINI PROJECT WITH SEMINAR
I Year M. Tech. II semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
0	0	4	2

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Learn new concepts and apply them to the solution of engineering problems
CO2:	Demonstrate the skills for performing literature survey, identify gaps, analyze the technical content
CO3:	Formulate and conduct experiments and utilize modern tools for developing working models / process / system
CO4:	Clearly communicate their ideas in writing and prepare a well-documented report
CO5:	Create informative PPTs and clearly communicate their ideas orally demonstrating technical knowledge

Syllabus Contents

The students are required to search / gather the material / information on a specific a topic comprehend it and present / discuss in the class.

Evaluation of Mini Project

- For Mini Project with Seminar, a student under the supervision of a faculty member, shall collect the literature on a topic and critically review the literature and submit it to the department in a report form.
- The student shall make an oral presentation before the Project Review Committee consisting of Head of the Department, supervisor/mentor and two other senior faculty members of the department.
- For Mini Project with Seminar, there will be only internal evaluation of 100 marks. A candidate has to secure a minimum of 50% of marks to be declared successful.

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Detailed Syllabus for M.Tech – VLSI Design & Embedded Systems - First Semester

RESEARCH METHODOLOGY AND IPR

Instruction: 3Periods/week	**Time: 3 Hours**	**Credits: 2**
Internal: 30Marks	**External: 70 Marks**	**Total: 100Marks**

Unit 1: Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

Unit 2: Effective literature studies approaches, analysis Plagiarism, Research ethics,

Unit 3: Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

Unit 4: Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

Unit 5: Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

Unit 6: New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.

References:

1. Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science& engineering students"
2. Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"
3. Ranjit Kumar, 2 ndEdition, "Research Methodology: A Step by Step Guide for beginners"
4. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd,2007.
5. Mayall, "Industrial Design", McGraw Hill, 1992.
6. Niebel, "Product Design", McGraw Hill, 1974.
7. Asimov, "Introduction to Design", Prentice Hall, 1962.
8. Robert P. Merges, Peter S. Menell, Mark A. Lemley, "Intellectual Property in New Technological Age", 2016.
9. T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008

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Audit Course
Organizational Behavior

M. Tech- VLSI Design and Embedded Systems

I -Semester	**Subject Code:**	**Instruction: 3 Periods/week**
Credits: 3	**Internal: 100 Marks**	**Total: 100 Marks**

Unit 1: Organizational Behavior

Concept of Organization - Concept of Organizational Behavior - Nature of Organizational Behavior - Role of Organizational behavior - Disciplines contributing to Organizational Behavior.

Unit 2: Motivation

Definition - Nature of Motivation - Role of Motivation - Theories of Motivation: Maslow's Need Hierarchy Theory, Herzberg's Motivation Hygiene Theory and McGregor's Theory X and Theory Y.

Unit 3: Group Dynamics

Meaning - Concept of Group - Types of groups -Formal and Informal groups - Group development - Group cohesiveness and factors affecting group cohesiveness

Unit 4: Leadership

Concept of Leadership - Difference between Leadership and Management - Importance of Leadership - Leadership styles: Autocratic leadership, Participative leadership and Free Rein leadership.

Unit 5: Communication

Meaning - Communication Process - Forms of communication: Oral, Written and Non- Verbal communication - Direction of communication: Downward, Upward and Horizontal communication.

Unit 6: Organizational conflicts

Concept of conflict - Reasons for conflict - Types of Conflict: Intrapersonal conflict, Interpersonal conflict, Intragroup conflict, Intergroup conflict, Inter organizational conflict - Conflict management.

Unit 7: Organizational Change

Nature - Factors in Organizational change -Planned change: Process of planned change - Resistance to change: Factors in resistance to change – Overcoming resistance to change.

Text Books:

1. L.M.Prasad: Organizational Behavior, Sultan Chand & Sons, New Delhi -110002.

Reference Books:

1. K. Aswathappa: Organizational Behavior, Himalaya Publishing House, New Delhi.
2. Stephen Robbins: Organizational Behavior, Pearsons Education, New Delhi.

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Audit Course

ENTREPRENEURSHIP

M. Tech-VLSI Design and Embedded Systems

II- Semester	**Subject Code:**	**Instruction: 3 Periods/week**
Credits: 3	**Internal: 100 Marks**	**Total: 100 Marks**

Unit 1: Basic Concepts of Management: Definition, Nature and Importance; Functions of the Management; Levels of Management; F.W Taylor's Scientific Management; Henry Fayol's Principles of Management.

Unit 2: Forms of Business Organizations: Introduction, Types of Business organizations: Private Sector-Individual Ownership, Partnership, Joint stock companies and Co-Operative organizations; Public sector-Departmental Organizations, Public Corporations and Government Companies; The Joint sector Management

Unit 3: Production and operations Management: Plant location- Factors to be considered in the selection of Plant location; Break - even analysis- Significance and managerial applications; Importance of Production Planning and Control and its Functions; Human Resource Management and Functions of Human Resource Manager (in brief); Functions of Marketing; Methods of Raising Finance

Unit 4: Entrepreneurship: Definition, Characteristics and Skills , Types of Entrepreneurs, Entrepreneur vs. Professional Managers, , Growth of Entrepreneurs, Nature and Importance of Entrepreneurs, Women Entrepreneurs, Problems of Entrepreneurship.

Unit 5: Entrepreneurial Development and Project Management: Institutions in aid of Entrepreneurship Development, Idea generation: Sources and Techniques;, Stages in Project formulation ; Steps for starting a small enterprise - Incentives for Small Scale Industries by Government

Text Books:

1. Sharma,S.C, and Banga, T.R., Industrial Organization & Engineering Economics, Khanna Publishers, Delhi, 2000.

Reference Books:

1. Vasant Desai ,The Dynamics of Entrepreneurial Development and Management (Planning for future Sustainable growth),H Imalayan Publishing House, 2018
2. Aryasri , A.R., Management Science, McGraw Hill Education (India Private Limited , New Delhi 2014.
3. Sheela, P. , and Jagadeswara Rao, K., Entrepreneurship, Shree Publishing House, Guntur

3/8/2024

Prof. P. VENKATESWARLU M.Com, MBA, Ph.D
Dept. of Commerce & Management Studies
Andhra University
VISAKHAPATNAM-530 003

3/8/2024

PRINCIPAL
College of Arts & Commerce
Andhra University
Visakhapatnam

MINUTES OF THE **FIRST MEETING OF THE ACADEMIC COUNCIL OF GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN (AUTONOMOUS)** HELD ON 27th July 2024 AT 11.00 AM IN THE COLLEGE CAMPUS, MADHURAWADA, VISAKHAPATNAM

Members present:

1.	Prof. Dr. Raj Kumar Goswami, Principal, GVPCEW (A)	Chairman
2.	Dr. G. Sudheer, Professor & Vice-Principal, GVPCEW (A)	
3.	Dr. P. V. S. L. Jagadamba, Chairperson, BoS & Head, Dept of CSE, GVPCEW (A)	
4.	Dr. D. K. Bebarta, Chairman, BoS, & Head, Dept of CSE (AIML), GVPCEW (A)	
5.	Dr. M Bhanu Sridhar, Chairman, BoS, & Head, Dept of IT, GVPCEW (A)	
6.	Dr. P. Murali Krishna Prasad, Chairman, BoS, & Head, Dept of ECE, GVPCEW (A)	
7.	Dr. R. V. S.Lakshmi Kumari, Chairperson, BoS, & Head, Dept of EEE, GVPCEW (A)	
8.	Dr. K. L. Sai Prasad, Chairman, BoS, & Head, Dept of BSH, GVPCEW (A)	
9.	Dr. P Devendra, Associate Prof., Dept of EEE, GVPCEW (A)	(Teacher of the College)
10.	Dr. K. Purushotam Naidu, Asst Prof., Dept of CSE (AIML), GVPCEW (A)	(Teacher of the College)
11.	Dr. D.V.A.N Ravi Kumar, Associate Prof., Dept of ECE, GVPCEW (A)	(Teacher of the College)
12.	Dr. N Sharmili, Associate Professor., Dept of CSE, GVPCEW (A)	(Teacher of the College)
13.	Dr. V. Sujatha, MD, DM (Cardiology)	(Expert – Medicine)

14.	Ms. Pooja Vidya Shankar, Head-Strategic Planning NASCOMM Centre of Excellence IoT & AI	(Expert – Engineering)
15.	Sri P Prabhakar, Superintending Engineer, APTRANSCO	(Expert-Industry)
16.	Prof. Dr. P. Mallikarjuna Rao, Dept of Electrical & Electronics Engineering AU College of Engineering, Visakhapatnam	(University Nominee)
17.	Prof. Dr. S. Vizianandа Row Dept of Computer Science & Systems Engineering AU College of Engineering, Visakhapatnam	(University Nominee)
18.	Prof. Dr. G. Sasibhusana Rao Dept of Electronics & Communication Engineering AU College of Engineering, Visakhapatnam	(University Nominee)
19.	Dr. C. Srinivas, Associate Professor, Dept of IT, GVPCEW (A)	Controller of Examinations
20.	Ms. Ch. Sirisha, Asst Prof, Dept of ECE, GVPCEW (A)	Member Secretary

Leave of absence : The following members/special invitees of Academic Council have obtained prior permission from the Chair to excuse their absence from the meeting

1. Ms. Lakshmi Mukkavalli, Managing Director, Patra India	(Expert – Industry)
2. Sri Pavan Kumar Allu, Technology Head at AI.Cloud for Lifesciences, TCS	(Expert-Industry)

Item- 1 : Welcome Address by Chairman of Academic Council, GVPCEW (A)

Dr. R.K.Goswami, Principal & Academic Council, Chairman, GVPCEW(A) extended a cordial welcome to all the members of the Academic Council of Gayatri Vidya Parishad College of Engineering for Women (Autonomous), and introduced the members present to the Academic Council. He also informed the names of those who have taken prior permission for their inability to attend the meeting.

He made a brief presentation about the credentials of the college and gave a broad idea about the academic plan of the college as it foresees from the academic year 2024-25 post autonomy.

Item-2- Ratification of experts onto Board of Studies of each department

The Member Secretary brought to the notice of the members; the list of experts nominated by the Chairman onto various Board of Studies. The Finalized lists were presented and sought ratification.

Resolution No.GVPCEW (A)-AC-I/07/24/1

The lists of members in the Board of Studies of various departments w.e.f 2024 as presented in Annexure I are ratified.

Item-3- Proposed Academic Regulations for approval

The Member Secretary laid out the proposed Academic Rules and Regulations of the Institution for approval. The members of the council discussed each of the points presented in the Academic Rules and Regulations (R24) and suggested

1. The Rules and Regulations regarding Minors and Honors programs, paper valuation and grading be adopted as per the Affiliating University (Andhra University) procedure.

All the suggestions were incorporated and the rules and regulations redrafted and presented.

Members have gone through the rules and regulations and resolved the following:

Resolution No.GVPCEW (A)-AC-I/07/24/2

1. The Academic Rules and Regulations (R24) with effective from 2024 for B.Tech Programmes including Minors and Honors as presented in Annexure II are approved.
2. The Academic Rules and Regulations (R24) with effective from 2024 for M.Tech Programmes as presented in Annexure III are approved

Item-4. Any other matter

Members have suggested the following:

- Conduct of FDPs in the thrust areas such as DevOps, AI/ML and Quantum Computing
- Explore the possibility of linking with the industry for value added courses.

The members appreciated the way of conduct of proceedings.

The meeting concluded with a Vote of Thanks by the Vice-Principal

Chairman of the Meeting
Academic Council
G.V.P College of Engineering for Women
Madhurawada
Visakhapatnam-530048

ANNEXURE - I

G.V.P. COLLEGE OF ENGINEERING FOR WOMEN

(Autonomous)

(Approved by AICTE, New Delhi and Affiliated to Andhra University, Visakhapatnam)

Madhurawada :: Visakhapatnam – 530 048

COMPOSITION AND MEMBERS OF BOARD OF STUDIES IN THE DEPARTMENT COMPUTER SCIENCE & ENGINEERING

(2024-2025 to 2027-2028)

1.	Head of the Department (Chairperson)	Dr.P.V.S.L.Jagadamba
2	All Faculty Members of the Department	
3	Subject Experts from outside the College	Dr. Siba Kumar Udgata Professor School of Computer and Information Sciences University of Hyderabad Hyderabad, 500046 email: udgata@uohyd.ac.in Mob: 9705395136
		Dr.Jyothi Vedurada Assistant Professor IIT-Hyderabad
		Dr.R Padmavathy Professor, Dept of CSE NIT – Warangal
4	Vice-Chancellor's Nomination	Dr. B Prajna, Professor, Dept. of Computer Science & Systems Engineering AU College of Engineering (A) Andhra University Mobile:9848750033 Email: prajna.maiha@gmail.com
5	Industry Representative	Dr.P.Gayatri Senior Technical Director / Scientist-F National Informatics Centre (NIC) Govt. of India
6	College Alumni	Ms. Sandeep Kaur Senior Software Developer Infinite Computer Solutions Visakhapatnam
7	Expert from outside the Autonomous College for Special Course	Mr.Narra Suresh Delivery Centre Head Infosys Visakhapatnam

Head of the Department
Computer Science & Engineering

Chairman
Academic Council

Principal
G.V.P. College of Engineering for Women
Madhurawada
Visakhapatnam-530048

G.V.P. COLLEGE OF ENGINEERING FOR WOMEN

(Autonomous)

(Approved by AICTE, New Delhi and Affiliated to Andhra University, Visakhapatnam)

Madhurawada :: Visakhapatnam – 530 048

COMPOSITION AND MEMBERS OF BOARD OF STUDIES IN THE DEPARTMENT COMPUTER SCIENCE & ENGINEERING (Artificial Intelligence & Machine Learning) (2024-2025 to 2027-2028)

1.	Head of the Department (Chairman)	Dr.D.K.Bebarta
2	All Faculty Members of the Department	
3	Subject Experts from outside the College	Dr.Debi Prosad Dogra Associate Professor IIT-Bhubaneswar
		Dr.Anjali Mahapatra Associate Professor IIIT - Bhubaneswar
4	Vice-Chancellor's Nomination	Dr. S. Vizianandа Row, Professor Dept of Computer Science & Systems Engineering AU College of Engineering, Visakhapatnam
5	Industry Representative	Dr.M Subrahmanya Sarma Vice President Accenture Bangalore
6	College Alumni	Ms. Vivekitha Sagi Lead Quality Engineer Persistent Systems Hyderabad
7	Expert from outside the Autonomous College for Special Course	Mr.Rajesh Srinivasan Vice-President – Consulting Delivery CGI India : IT and Business Consulting Services Hyderabad

Head of the Department
Computer Science & Engineering (AIML)

Chairman
Academic Council

Principal
G.V.P College of Engineering for Women
Madhurawada
Visakhapatnam-530048

G.V.P. COLLEGE OF ENGINEERING FOR WOMEN

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COMPOSITION AND MEMBERS OF BOARD OF STUDIES IN THE DEPARTMENT INFORMATION TECHNOLOGY

(2024-2025 to 2027-2028)

1.	Head of the Department (Chairman)	Dr.M Bhanu Sridhar
2	All Faculty Members of the Department	
3	Subject Experts from outside the College	Dr. Rashmi Ranjhan Rout Professor, Dept of CSE NIT-Warangal
		Dr.N. Rukma Rekha Associate Professor, Dept of CSE University of Hyderabad Hyderabad
4	Vice-Chancellor's Nomination	Dr. Kunjam Nageswara Rao Professor Dept of Information Technology AU College of Engineering, Visakhapatnam
5	Industry Representative	Mr. Sasidhar Maruvada Managing Director nu Vizz Software Solutions Bangalore
6	College Alumni	Ms. G Dhana Lakshmi Assistant Professor Dept of CSE, JNTUKCE JNTUK-Kakinada
7	Expert from outside the Autonomous College for Special Course	Mr.Ayyalasomayajula Siva Sankar Principal Consultant / Key Product Manager Sposea B.V. Bangalore

Head of the Department
Information Technology

Chairman
Academic Council

Principal
G V.P College of Engineering for Women
Madhurawada
Visakhapatnam-530048

G.V.P. COLLEGE OF ENGINEERING FOR WOMEN

(Autonomous)

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COMPOSITION AND MEMBERS OF BOARD OF STUDIES IN THE DEPARTMENT ELECTRICAL & ELECTRONICS ENGINEERING (2024-2025 to 2027-2028)

1.	Head of the Department (Chairperson)	Dr.R.V.S.L.Kumari
2	All Faculty Members of the Department	
3	Subject Experts from outside the College	Dr.K Srikumar Professor, Dept of EEE JNTU-GV Vizianagaram
		Dr.A Hemachender Assistant Professor, Dept of EEE NIT-Puducherry Puducherry
4	Vice-Chancellor's Nomination	Dr. P Mallikarjuna Rao Professor Dept of Electrical & Electronics Engineering AU College of Engineering, Visakhapatnam
5	Industry Representative	Dr. M Santhosh Kumar System Design Engineer Sensata Technologies Pune
6	College Alumni	Ms. CH Vijayalakshmi Junior Electrical Engineer ACUTRONIC India Pvt Ltd Hyderabad.
7	Expert from outside the Autonomous College for Special Course	Ms. I Kavya Associate Senior Electrical Engineer Burnsand Mc Donnells India Pvt Ltd Bangalore

Head of the Department
Electrical & Electronics Engineering

Chairman
Academic Council

Principal
G V.P College of Engineering for Women
Madhurawada
Visakhapatnam-530048

G.V.P. COLLEGE OF ENGINEERING FOR WOMEN

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COMPOSITION AND MEMBERS OF BOARD OF STUDIES IN THE DEPARTMENT ELECTRONICS & COMMUNICATION ENGINEERING

(2024-2025 to 2027-2028)

1.	Head of the Department (Chairman)	Dr.P.M.K.Prasad
2	All Faculty Members of the Department	
3		Dr. Tapan Kumar Gandhi (Ph.D.) FNAE, SMIEEE Professor, Department of Electrical Engineering Indian Institute of Technology Delhi Cadence Chair Professor in Artificial Intelligence & Automation Convener, Computer Technology Chairperson, Project Prakash Charitable Trust Adjunct Faculty, School of AIDE, IIT Jodhpur Email: tgandhi@ee.iitd.ac.in, Ph. : 011-26591153
		Dr. Venkata Mani V Professor, Department of ECE NIT – Warangal
4	Vice-Chancellor's Nomination	Dr. P Rajesh Kumar Professor Dept. of Electronics & Communication Engineering AU College of Engineering (A) Visakhapatnam
5	Industry Representative	Sri A Venkata Krishna CEO Ascentsemi R & D Pvt Limited Bangalore
6	College Alumni	Ms. Krishna Deepika Chittela Staff Engineer - Synopsys Bangalore
7	Expert from outside the Autonomous College for Special Course	Sri Amal Raj Pukkella Founder Digifac Services Pvt Ltd., & COO, Headfitted Pvt Ltd Visakhapatnam

Head of the Department
Electronics & Communication Engineering

Chairman
Academic Council

Principal
G V.P College of Engineering for Women
Madhurawada
Visakhapatnam-530048

G.V.P. COLLEGE OF ENGINEERING FOR WOMEN

(Autonomous)

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COMPOSITION AND MEMBERS OF BOARD OF STUDIES IN THE DEPARTMENT BASIC SCIENCES & HUMANITIES - ENGLISH

(2024-2025 to 2027-2028)

1.	Head of the Department (Chairman)	Dr.K L Sai Prasad
2	All Faculty Members of the Department	
3	Subject Experts from outside the College	Dr.G Survana Lakshmi Professor, Dept of ELT School of English Language Education, EFL University, Hyderabad
		Dr.Chandreie Mukherjee Assistant Professor Department of English IIM Visakhapatnam
4	Vice-Chancellor's Nomination	Dr. N Solomon Benny Assistant Professor & Head of the Department Dept of English, College of Arts & Commerce AU College of Engineering, Visakhapatnam
5	Industry Representative	Ms. Shameem Bhanu Executive Business Administrator, The Quantum AI, Hi-Tech City, Hyderabad
6	College Alumni	Ms. Sai Sindhura Kuppili Guidewire Developer PWC, Hyderabad
7	Expert from outside the Autonomous College for Special Course	Mr. Prasad Boya Director – Operations Quantum AI, Hi-tech City Hyderabad

Head of the Department
Basic Sciences & Humanities

Chairman
Academic Council

Principal
G V.P College of Engineering for Women
Madhurawada
Visakhapatnam-530048

G.V.P. COLLEGE OF ENGINEERING FOR WOMEN

(Autonomous)

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COMPOSITION AND MEMBERS OF BOARD OF STUDIES IN THE DEPARTMENT BASIC SCIENCES & HUMANITIES - CHEMISTRY (2024-2025 to 2027-2028)

1.	Head of the Department (Chairman)	Dr.K L Sai Prasad
2	All Faculty Members of the Department	
3	Subject Experts from outside the College	Dr.Someswara Rao S Associate Professor Department of Chemistry IIT-Tirupathi
		Dr.Suresh Babu Kalidindi Associate Professor Dept of Chemistry Central Tribal University of AP Vizianagaram
4	Vice-Chancellor's Nomination	Dr. K Basavaiah Professor, Dept of Chemistry College of Science & Technology Andhra University Visakhapatnam
5	Industry Representative	Ms. M Santhoshi Rupa Associate Manager Department of Manufacturing Compliance Pfizer Health Care India Pvt Ltd Lemarthy Village, Parawada Mandal Visakhapatnam
6	College Alumni	Ms. Syed Suhana Amazon Web Services Bangalore
7	Expert from outside the Autonomous College for Special Course	Mr.Akasapu Raviteja Senior Chemist Titanish Laboratories, Chodavaram Vizianagram

Head of the Department
Basic Sciences & Humanities

Chairman
Academic Council

Principal
G V.P College of Engineering for Women
Madhurawada
Visakhapatnam-530048

G.V.P. COLLEGE OF ENGINEERING FOR WOMEN

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COMPOSITION AND MEMBERS OF BOARD OF STUDIES IN THE DEPARTMENT BASIC SCIENCES & HUMANITIES - MATHEMATICS (2024-2025 to 2027-2028)

1.	Head of the Department (Chairman)	Dr.K L Sai Prasad
2	All Faculty Members of the Department	
3	Subject Experts from outside the College	Dr. P A Lakshmi Narayana Professor, Dept of Mathematics IIT – Hyderabad
		Dr.Kasi Viswanadham K N S Professor, Dept of Mathematics NIT - Warangal
4	Vice-Chancellor's Nomination	Dr. Ch.Santhi Sundar Raj Professor Dept of Engineering Mathematics AU College of Engineering (A) , Visakhapatnam
5	Industry Representative	Dr. A R J Srikanth Director Databrew Technologies Pvt Ltd
6	College Alumni	Ms. Anitha Chiluvuri Senior Member of Technical Staff (SMTS) Oracle
7	Expert from outside the Autonomous College for Special Course	Mr. Anil Kumar Paluri Assistant Vice President Bank of America

Head of the Department
Basic Sciences & Humanities

Chairman
Academic Council

Principal
G V.P College of Engineering for Women
Madhurawada
Visakhapatnam-530048

G.V.P. COLLEGE OF ENGINEERING FOR WOMEN

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COMPOSITION AND MEMBERS OF BOARD OF STUDIES IN THE DEPARTMENT BASIC SCIENCES & HUMANITIES - PHYSICS (2024-2025 to 2027-2028)

1.	Head of the Department (Chairman)	Dr.K L Sai Prasad
2	All Faculty Members of the Department	
3	Subject Experts from outside the College	Dr.G. Padmaja Rani Professor & HOD Dept of Physics University College of Engineering JNTUK-Kakinada
		Dr.Arun Kumar R Assistant Professor & HOD School of Sciences NIT-AP
4	Vice-Chancellor's Nomination	Dr. S Srinivasa Rao Professor, Dept of Physics College of Science & Technology Andhra University Visakhapatnam
5	Industry Representative	Dr. Y Purushotham Scientist Centre for Materials for Electronics Technology (C-MET) IDA Phase-III, Cherlapally HCL (PO) Hyderabad
6	College Alumni	Ms. K Hrudaya Team Lead CAPGEMINI
7	Expert from outside the Autonomous College for Special Course	Dr.K.V.Ramesh Sr. Professor Department of Physics GITAM Institute of Sciences GITAM University Visakhapatnam

Head of the Department
Basic Sciences & Humanities

Chairman
Academic Council

Principal
G V.P College of Engineering for Women
Madhurawada
Visakhapatnam-530048

G.V.P. COLLEGE OF ENGINEERING FOR WOMEN

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COMPOSITION AND MEMBERS OF BOARD OF STUDIES IN THE DEPARTMENT BASIC SCIENCES & HUMANITIES – MANAGEMENT STUDIES (2024-2025 to 2027-2028)

1.	Head of the Department (Chairman)	Dr.K L Sai Prasad
2	All Faculty Members of the Department	
3	Subject Experts from outside the College	Dr.A.Narasimha Rao Department of Commerce and Management Studies Andhra University, South Campus, Waltair Junction, Visakhapatnam, Andhra Pradesh, India – 530003 Ph. No. 98483 77644 Email: addada@rediff.com
		Dr.P.Venkata Rao Professor GVP College of Engineering (A) Visakhapatnam 8885043433 pvenkataro@gvpce.ac.in
4	Vice-Chancellor's Nomination	Dr. P Venkateswarlu Professor Dept of Commerce & Management Studies College of Arts & Commerce Andhra University Visakhapatnam
5	Industry Representative	Sri P Rama Krishna IIM Udaipur Founder, Think plus.
6	College Alumni	Tsapala Srujana TCS Human Resource Business Partner
7	Expert from outside the Autonomous College for Special Course	Dr.K.V.V.Murali Someswararao Professor GVP college for Degree and PG courses

Head of the Department
Basic Sciences & Humanities

Chairman
Academic Council

Principal
G V.P College of Engineering for Women
Madhurawada
Visakhapatnam-530048

ANNEXURE - II

ACADEMIC RULES AND REGULATIONS (R-24)

FOR B.TECH. PROGRAMMES INCLUDING HONORS AND MINORS

[Under Choice Based Credit System in line with NEP 2020]

[Effective from 2024-25 admitted batch]

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN

(AUTONOMOUS)

MADHURAWADA, VISAKHAPATNAM 530048

AFFILIATED TO ANDHRA UNIVERSITY, VISAKHAPATNAM

ACADEMIC REGULATIONS

FOR B.TECH. PROGRAMMES INCLUDING HONORS AND MINORS

(Under Choice Based Credit System effective from 2024-25 admitted batch)

These Regulations shall be called the **"GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN (AUTONOMOUS) - REGULATIONS 2024 (R-24) FOR THE AWARD OF B.TECH. DEGREE".** These regulations shall be applicable for students enrolling for B.Tech. degree programmes at the Institute from Academic Year 2024-25.
The admission of students shall be as per Govt. of Andhra Pradesh rules.
The medium of instruction for course work and examinations at the Institute shall be English.

1. **Award of the Degree/ Degree with Minor specialization/ Degree with Honors Specialization:**

(a) Award of the B.Tech. Degree / B.Tech. Degree with a Minor if she fulfils the following:

(i) Pursues a course of study for not less than four academic years and not more than eight academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would in addition to the maximum period permitted for graduation (Eight years).

(ii) Registers for 160 credits and secures all 160 credits.

(b) Award of B.Tech. degree with Honors if she fulfils the following:

(i) Student secures an additional 15 credits fulfilling all the requisites of a B.Tech. program i.e., 160 credits.

(ii) Honors is to be completed simultaneously with B.Tech. programme.

2. **Structure of the B.Tech. program:**

S. No.	Category	Code	Credits breakup
1	Humanities and Social science including Management courses	HSMC	10.5
2	Basic Science courses	BSC	16 -18*
3	Engineering Science courses	ESC	22 – 27*
4	Professional Core Courses	PCC	51 – 54*
5	Open Elective Courses	OEC	12
6	Professional Elective courses	PEC	15
7	Project work, Internship, Seminar	PROJ	18
8	Mandatory courses (Non-credit)	MC	-
9	Skill oriented Courses	SoC	10
		Total Credits	**160**

*The actual value is based on the Department's breakup for the courses.

The credits are allotted as:
1 Hr. Lecture (L) per week - 1 credit
1 Hr. Tutorial (T) per week - 1 credit
1 Hr. Practical (P) per week - 0.5 credits.

2.1 Semester-wise structure:

<table>
<tr><th>Semester</th><th colspan="2">Composition</th><th>Credits</th></tr>
<tr><td>0</td><td colspan="2">Induction Programme (2-3 weeks)</td><td>0 Credits</td></tr>
<tr><td>I</td><td>5 Theory + 3 Labs
[19.5 Credits]</td><td rowspan="2"></td><td rowspan="2">39 Credits</td></tr>
<tr><td>II</td><td>5 Theory + 3 Labs
[19.5 Credits]</td></tr>
<tr><td>III</td><td>5 Theory + 2/ 3 Labs + 1 skill lab
[20-21.5 Credits]</td><td rowspan="2">Includes
Non-Credit Mandatory Courses
PEUHV& NCC/NSS/Social Activities/ Life skills/ ES</td><td rowspan="2">41.5 Credits</td></tr>
<tr><td>IV</td><td>5 Theory + 2/3 Labs + 1 skill lab
[20-21.5 Credits]</td></tr>
<tr><td colspan="4">Intern-I: 2 Months Community oriented Internship (CSP-Mandatory) during summer vacation</td></tr>
<tr><td>V</td><td>3 Theory + 2/3 Labs + 1 PE+ 1 OE + 1 skill course + Internship-I
[22-23.5 Credits]</td><td rowspan="2">Includes
Non-Credit Mandatory Courses</td><td rowspan="2">43.5 Credits</td></tr>
<tr><td>VI</td><td>3 Theory + 2/3 Labs + 1 PE + 1 OE + 1 skill course
[20-21.5 Credits]</td></tr>
<tr><td colspan="4">Intern-II: 2 Months Industrial/Research Internship (Mandatory) during summer vacation</td></tr>
<tr><td>VII</td><td>3 PE + 2 OE +1 HSSE+1 skill course + Industrial Internship-II
[22 credits]</td><td></td><td>22 Credits</td></tr>
<tr><td>VIII</td><td>Project work / Internship in Industry
[14 credits]</td><td></td><td>14 Credits</td></tr>
<tr><td colspan="3">TOTAL CREDITS FOR REGULAR PROGRAMME</td><td>160 Credits</td></tr>
</table>

Non-credit mandatory courses: Environmental Sciences, Human Values & Professional Ethics, Indian Constitution, Essence of Indian Traditional Knowledge

Students opting for Minors shall complete 4 courses from the prescribed list during IV to VII Semesters by registering for a minimum of one course in each semester and earn 12 credits.

Students opting for Honors shall complete 5 courses from the prescribed list during IV to VII Semesters by registering for a minimum of one course in each semester and earn 15 credits.

3. **Student Induction Programme:** There will be mandatory student induction programme for freshers for two to three weeks before the commencement of first semester. Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations etc.

4. A student shall register for courses in each semester offered by the concerned department under Choice Based Credit System (CBCS). The Open Electives are offered to students of all branches in general. However, a student shall choose an open elective from the list in such a manner that she has not studied the same course during the Programme.

5. All the students shall register for NCC/NSS/Social activities/life skills. A student will be required to participate in an activity for two hours in a week during Third/ Fourth/ Fifth semesters. Grade shall be awarded as Satisfactory or Unsatisfactory in the mark sheet on the basis of participation, attendance, performance and behavior. If a student gets an unsatisfactory Grade, she shall repeat the above activity in the subsequent years, in order to complete the degree requirements.

6. A student shall be permitted to pursue up to a maximum of 20% of total credits (i.e., 32 Credits out of a total 160 credits) from elective courses (from Professional, HSS and Open Electives only) under MOOCs during B.Tech. programme. Every student shall mandatorily complete a minimum one course under MOOCs. Each of the courses must be of a minimum 8 weeks/ 12 weeks in duration. One faculty in-charge is nominated for each course to monitor the registration and progression of the student. Attendance will not be counted for courses under MOOCs. The Head of the department shall notify the list of such courses at the beginning of the semester. The student has to pursue and acquire a certificate for a course under MOOCs (NPTEL/SWAYAM) from the organizations/agencies approved by the BoS in order to earn the 2 credits/ 3 credits within the same semester.

7. The students shall register for professional and open elective courses at the beginning of the semester. There shall be a limit on the minimum and maximum number of registrations based on class / section strength.

8. Students shall undergo mandatory summer internships for a minimum of six weeks duration each at the end of second and third year of the Programme. There shall also be mandatory full internship in the final semester of the Programme. (implementation shall be in line with the guidelines of APSCHE / affiliating University).

9. **Attendance Requirements:**

   i) A student shall be eligible to appear for end semester examinations if she acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester.
   - In the case of students who participate in activities like NSS, NCC, sports, intercollegiate tournaments conducted at National level/State Level/ University Level with prior approval of the Principal, the candidate may be deemed to have attended the college during the actual period of such activity, solely for the purpose of attendance.
   - Participating in the seminar, workshop, conference with prior approval of the Principal, the candidate may be deemed to have attended the college during the actual period of

such activity, solely for the purpose of attendance permission. The maximum period of such events is limited to 10 days.

- In the case of students admitted under special circumstances (late admission / transfer etc.,), the candidate shall attend at least 50% of the total classes held during semester and shall have attended at least 75% of the total classes held from the date of admission of the student.

ii) Condonation for shortage of attendance in aggregate up to 10% (greater than 65% and less than 75%) in each semester may be granted on medical grounds. A stipulated fee shall be payable to the college towards condonation of shortage of attendance.

iii) Students whose shortage of attendance is not condoned in any semester are detained and are not eligible to take their end semester examination of that class and their registration shall stand cancelled.

iv) A student will not be promoted to the next semester unless she satisfies the attendance requirements of the present semester, as applicable. They shall seek readmission and continue her course of study from that semester when offered next.

10. Method of Evaluation:

The performance of a student in each semester shall be evaluated through Continuous Internal Evaluation and End Semester Examination. The student shall earn the credits in the respective courses by obtaining at least the marks as specified in the pass criteria given below:

S. No	Type of Course	Continuous Internal Evaluation	End Semester Examination (3 hours)		Pass Criteria
			Max Marks	Evaluation	
1.	Theory Courses	30 Marks Evaluation process: 20 marks (Two internal tests each for 20 marks.) 10 marks (Four assessments 2 before mid1 and 2 before mid-2 by at least any two of the following methods each for 05 marks. (Assessment Methods: Assignment / Quiz / Term paper / Surprise test / seminar / Open book test / Case study / Projects /Any other Teacher specific method). The final internal score is [4*(best of the two out of 30) +1*(the other mark)]/5	70 Marks	Double Valuation	**40% (28 marks) from End semester and 40% (40 marks) on aggregate from Internal and End semester Examination put together.**

S. No	Type of Course	Continuous Internal Evaluation	End Semester Examination (3 hours)		Pass Criteria
			Max Marks	Evaluation	
2.	Professional Elective/ Open Elective	30 Marks (same as that for Theory course in S. No. 1)	70 Marks	Double Valuation	**40% (28 marks) from End semester and 40% (40 marks) on aggregate from Internal and End semester Examination put together.**
3.	Practical Courses Including CAD/e-CAD and Engg. Workshop	50 Marks 20 marks (15 marks for day-wise performance including observation and viva, 5 marks for record.) 30 marks (from the best of the two internal examinations, each being conducted at the end of a cycle/mid semester).	50 Marks	Single Valuation	**50% (25 marks) from End semester Examination and 50% (50 marks) on aggregate from Internal and End semester Examinations put together.**
4.	Design Thinking & Innovation Courses	50 Marks Design thinking phase-wise performance assessment	50 Marks	Single Valuation	**50% (25 marks) from End semester Examination and 50% (50 marks) on aggregate from Internal and End semester Examinations put together.**
5.	Skill Oriented Courses	50 Marks 20 marks (day-wise performance including observation and viva) 30 marks (from internal examinations at the end of the semester).	50 Marks	Single Valuation (Based on report and viva voce examination conducted by concerned teacher and a senior expert in the subject from the same department)	**50% (25 marks) from End semester Examination and 50% (50 marks) on aggregate from Internal and End semester Examinations put together.**

S. No	Type of Course	Continuous Internal Evaluation	End Semester Examination (3 hours)		Pass Criteria
			Max Marks	Evaluation	
6.	Non-Credit Mandatory courses	-	100 Marks	Single Valuation	**40% (40 Marks) from End Semester Examination. No marks or letter grade shall be allotted for all the non- credit mandatory courses.**
7.	Summer Internships / Community Service Project	-	100 Marks	Single Valuation Through an Internal committee (comprising of HoD, Supervisor and a senior faculty of the department) based on Report (50%), Presentation and Viva-voce (50%).	**50% (50 Marks) from End Semester Examination.**
8.	Project Work	50 Marks 25 marks (Two reviews each for 25 Marks based on the progress, through an Internal committee comprising of HoD, Project Supervisor and a senior faculty of the department. The final score is 1/3rd of the I Review and 2/3rd of the II Review) 25 marks (Given by the guide according to the given rubric	150 Marks	Single Valuation (based on the report, Presentation and Viva-voce examination).	**50% (75 marks) from End semester Examination and 50% (100 marks) on aggregate from Internal and End semester Examinations put together.**

Note 1: If a student misses both the mid examinations in an ongoing semester, then on satisfactory medical grounds, she is permitted to take a re-test before external examination of that semester based on either mid-I or mid-II syllabus and 80% of the marks will only be considered.

11. Valuation of Scripts:

For both single and double valuation, a chief examiner shall be appointed for each theory course to monitor the valuation process and evaluate at least 10% of scripts per bundle at random for which the marks awarded by the chief examiner shall be final.
In case of double valuation, in addition to the above,

i) If the difference between the first and second valuations is less than or equal to 10 marks (15% of 70 marks), the better of the two valuations shall be awarded.

ii) If the difference between the first and second valuations is more than 10 marks (15% of 70 marks), the chief examiner shall value the script. Out of the three valuations, the average of marks obtained in third valuation and the marks obtained nearer to third valuation out of first two valuations shall be considered.

12. Supplementary Examinations:

Supplementary examinations will be conducted only with the corresponding regular examinations.
If a student fails in Design Thinking and Innovation courses/Internship (Industrial or Research or Community Service Project) / Comprehensive Viva/ final semester Project Work, the student shall appear for supplementary examination as and when conducted.

13. Revaluation:

i) Revaluation of any theory subject shall be entertained within a stipulated period on payment of specified fee.

ii) There is no revaluation for any lab subjects/practical subjects/skill-oriented courses.

14. Withholding of Result:

The result of a student in a semester shall be withheld and not declared if the student has disciplinary action pending against her.

15. Promotion Rules:

A student shall fulfill the minimum attendance requirements in every semester for promotion to next semester, as mentioned in point 9.

16. Grading:

The marks obtained in each subject (out of 100 marks) will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student fall.
Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale.
Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P and F.

Grades and Grade Points

Marks Range		Letter Grade		Grade Point
Theory (including Mandatory courses)	Practical, Drawing, Design Thinking, SoCs, Internships, Project			
> 90 to ≤ 100	> 90 to ≤ 100	O	Outstanding	10
> 80 to ≤ 90	> 80 to ≤ 90	A+	Excellent	9
> 70 to ≤ 80	> 70 to ≤ 80	A	Very Good	8
> 60 to ≤ 70	> 60 to ≤ 70	B+	Good	7
> 55 to ≤ 60	> 55 to ≤ 60	B	Above Average	6
≥ 50 to ≤ 55	≥ # 50 to ≤ 55	C	Average	5
≥ *40 to < 50	-	P	Pass	4
< 40	-	F	Fail	0
		Ab	Absent	0

* Pass mark for Theory courses, # Pass mark for all other courses

Calculation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

i) The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.

$$SGPA = \Sigma (C_i \times G_i) / \Sigma C_i$$

where, C_i is the number of credits of the i^{th} subject and G_i is the grade point scored by the student in the i^{th} course

ii) The CGPA will be computed in the same manner as taking into account all the courses undergone by a student over all the semesters of a program, i.e.

$$CGPA = \Sigma (C_i \times S_i) / \Sigma C_i$$

where S_i is the SGPA of the i^{th} semester and C_i is the total number of credits in that semester. CGPA is calculated from II semester onwards up to the final semester, considering all the courses offered from the First semester onwards.

iii) Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts. CGPA is calculated for those who clear all the courses including present semester.

iv) While computing the SGPA/CGPA, the subjects in which the student is awarded Zero grade points will also be included.

v) A candidate has to secure a minimum of 5.0 SGPA for a pass in each semester.

17. Award of Degree:

A. Eligibility for the award of Degree/ Degree with Minor:

A student shall be eligible for the award of the B.Tech. Degree/ B.Tech. Degree with Minor if she fulfills the following conditions:

i) Register and successfully complete all the courses prescribed within the stipulated period.

ii) Earn 160 credits for B.Tech. degree/ earn 12 credits within 160 credits for B.Tech. with Minor degree and pass in all non-credit mandatory courses.
iii) Secure satisfactory grade in social activity.
iv) No disciplinary action is pending against her.
v) Pays the prescribed fee for all the years.

B. Eligibility for the award of degree with Honors:
A student shall be eligible for the award of degree with Honors in a specific specialization if she satisfies conditions i, iii, iv, v cited above (17.A) and earns 15 credits in addition to 160 Credits.

The student eligible for award of B.Tech. degree, shall be placed in one of the following:

Class Awarded	CGPA Secured
First Class with Distinction	**≥ 7.0** (within four years for regular and three years for lateral entry without any supplementary appearance in any semester)
First Class	**≥ 6.0 and < 7.0**
Second Class/ Pass	**≥ 5.0 and < 6.0**

CGPA to Percentage of Marks: Equivalent percentage of marks = **CGPA*10**

18. Gap Year - concept of Student Entrepreneur in Residence:

Outstanding students who wish to pursue entrepreneurship are allowed to take a break of one year at any time after I year / II year / III year to pursue entrepreneurship full time. This period shall be counted for the maximum time for graduation. An evaluation committee at the college level shall be constituted to evaluate the proposal submitted by the student and the committee shall decide on permitting the student for availing the Gap Year.

19. Curricular Framework for Mandatory Internships:

i) Two summer internships each with a minimum of six weeks duration, done at the end of IV and VI semesters, respectively are mandatory. The internship can be done by the students at local industries, Govt. Organizations, Construction agencies, Hydel and thermal power projects and in software MNCs.
ii) Evaluation of the summer internships shall be through the Departmental Committee comprising the Head of the Department as chairman and two faculty of the department including the Supervisor. A student will be required to submit a summer internship report to the concerned department and appear for an oral presentation before the departmental committee. The report and the oral presentation shall carry 40% and 60% weightages, respectively.
iii) In the final semester, the student shall mandatorily undergo internship and parallelly she shall work on a project with well-defined objectives. At the end of the semester the candidate shall submit an internship completion certificate and a project report on the work carried out. The project work shall be evaluated with an external examiner.
iv) The student internship programs shall be facilitated and monitored through a college level

committee with three senior faculty members including supervisor. Completion of internships is mandatory, if any student fails to complete internship, she will not be eligible for the award of degree. In such cases, the student shall repeat and complete the internship.

20. Curricular Framework for Skill oriented Courses (SoCs):

i) Out of the five skill courses two shall be skill-oriented courses from the same domain and shall be completed in the second year. Of the remaining 3 skill courses, one shall necessarily be a soft skill course and the remaining 2 shall be skill-advanced courses either from the same domain or Job oriented skill courses, which can be of inter disciplinary nature.

ii) The student can choose either the skill courses being offered by the department or to choose a certificate course being offered by industries / Professional bodies / APSSDC or any other accredited bodies as approved by the concerned BoS.

iii) If a student chooses to take a Certificate Course offered by Industries / Professional bodies / APSSDC or any other accredited bodies, in lieu of the skill advanced course offered by the department, the credits shall be awarded to the student upon producing the Course Completion Certificate from the agency / professional bodies as approved by the BoS.

iv) If a student prefers to take a certificate course offered by external agency, attendance shall be computed by excluding the skill course in all the calculations of mandatory attendance requirements upon producing a valid certificate as approved by the concerned HoD. The student is deemed to have fulfilled the attendance requirement of the course and acquire the credits assigned to the course.

v) The grades / marks given for a course by external agencies will be converted to the equivalent grades / marks of GVPCEW(A).

21. Community Service Project (Experiential learning through community engagement):

i) Every student should put in a minimum of 180 hours for the Community Service Project during the summer vacation.

ii) Each class/section should be assigned with a mentor

iii) Specific Departments concentrate on their major areas of concern.

iv) A log book has to be maintained by each of the student, where the activities undertaken / involved to be recorded.

v) The log book has to be countersigned by the concerned mentor/faculty incharge.

vi) Evaluation will be done based on the active participation of the student and grade will be awarded by the mentor/faculty member.

vii) The final evaluation will be reflected in the grade memo of the student.

viii) The Community Service Project should be different from the regular programmes of NSS / NCC / Green Corps/Red Ribbon Club, etc.

ix) Minor project report should be submitted by each student. An internal Viva will be conducted by a committee constituted by the principal of the college.

22. Curricular Framework for Minor Programme:

To promote interdisciplinary knowledge among the students, the students admitted into B.Tech. in a major stream/branch are eligible to obtain degree in Minor in another stream.

i) The Minor program requires completion of 12 credits in Minor stream chosen.

ii) Two courses for 06 credits related to Minor are to be pursued compulsorily for the minor degree, but maybe waived for students who have done similar/equivalent courses. If waived for a student, then the student must take an extra elective course in its place. It is recommended that students should complete the compulsory courses (or equivalents) before registering for the electives.

iii) Electives (minimum of 2 courses) to complete a total of 12 credits.

Note: A total of 4 (four) Open Electives are offered in the curriculum. A student can complete the requirement for Minor by opting for the courses offered through various verticals/tracks under Open Electives.

- **No entry conditions on CPGA/ backlogs.**

23. Curricular Framework for Honors:

i) Students of a department / discipline are eligible to opt for Honors Programme offered by the same department / discipline and can select the additional and advanced courses from their respective branch.

ii) The enrolment of student into Honors is based on the CGPA obtained in the major degree program. CGPA shall be taken up to III semester in case of regular entry students and only III semester in case of lateral entry students. Students having 7.0 CGPA without any backlog subjects will be permitted to register for Honors.

iii) A student is permitted to register for Honors in IV semester after the results of III Semester are declared and students may be allowed to take maximum two subjects per semester pertaining to the Honors from IV Semester onwards.

iv) Attendance will not be monitored for MOOC courses. Students have to acquire a certificate from the agencies approved by the BoS with grading or marks or pass/fail. If the MOOC course is a pass/fail course without any grades, the grade shall be assigned as per the recommendations of the Academic Council.

v) It is the responsibility of the student to acquire / complete prerequisites before taking the respective course. The courses offered in each pool shall be domain specific courses and advanced courses. Each pool can have theory as well as laboratory courses. If a course comes with a lab component, that component has to be cleared separately.

vi) If a student has already studied any course from the list prescribed for B.Tech (Honors), she shall be permitted to choose any other course listed under professional electives of the respective B.Tech. programme.

vii) If a student drops or is terminated from the Honors program, the additional credits so far earned cannot be converted into open or core electives; they will remain extra. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.

viii) Transfer of credits from Honors to regular B. Tech degree and vice-versa will not be permitted.

ix) Honors is to be completed simultaneously with a Major degree program.

Registration for Honors:

i) The students having **7.0 CPGA** without backlog subjects will be permitted to register for Honors.

ii) The eligible and interested students shall apply through the Head of the Department (HOD) of her parent department. The whole process should be completed within one week before the start of every semester. Selected students shall be permitted to register for the courses under Honors.

iii) The selected students shall submit their willingness to the principal through her parent department offering Honors. The parent department shall maintain the record of student pursuing the Honors.

iv) The students enrolled in the Honors courses will be monitored continuously. An advisor/mentor from parent department will be assigned to a group of students to monitor the progress.

v) If a student is detained due to lack of attendance either in major or in Honors, registration shall be cancelled.

vi) Honors is to be completed simultaneously with B.Tech. programme.

24. Other Common guidelines for Honors / Minor Programme:

i) A student shall be permitted only to register either for Honors or for Minor programme.

ii) Administration reserves the right to decide on the minimum enrolments for offering Honors / Minor program by the department. If a minimum enrolments criterion is not met, then the students may be permitted to register for the equivalent MOOC courses as approved in BoS.

iii) A student shall be permitted to register for Honors program at the beginning of IV semester subject to a maximum of two additional courses per semester, provided that the student must have acquired 7.0 CGPA upto the end of II semester without any backlogs. In case the III semester results are declared after the commencement of the IV semester, and if a student fails to acquire 7.0 CGPA upto III semester or failed in any of the courses, her registration for Honors program stands cancelled and she shall continue with the regular Programme. The CGPA of 7.0 has to be maintained in the subsequent semesters of regular B.Tech. programme, without any backlog in order to keep the registration for Honors programme active.

iv) The admission into Honors / Minor shall be strictly on the merit basis only. In case of a tie the GPA secured in the core courses shall be taken into consideration.

v) A student shall be permitted to appear for the end semester examinations, provided she puts up a minimum attendance of 75% in each course registered. However, condonation for shortage of attendance between 65-74% may be given on medical grounds. The student concerned will be permitted to take the end semester examination, on payment of condonation fee.

vi) The internal and end semester evaluation for Theory, Practical and Mini-Project shall be same as that of similar type of courses in regular B.Tech. programme.

vii) The Honors / Minor degree will be awarded only after successfully acquiring stipulated

Credits. A separate CGPA will be given for the Honors / Minor programme and no Class / Division will be awarded. Withdrawal from Honors / Minor programme is allowed in any semester.

viii) If a student drops or is terminated from the Honors program, the additional credits so far earned cannot be converted into free or core electives; they will remain extra. These additional courses will find mention in the transcript (but not in the degree certificate).
In such cases, the student may choose between the actual grade or a "pass (P)" grade and choose to omit the mention of the course as per the following:

a) All the courses done under the dropped Honor will be shown in the transcript and
b) None of the courses done under the dropped Honor will be shown in the transcript (implementation shall be in line with the guidelines of APSCHE / affiliating University)

ix) In case a student
a) fails to meet attendance requirement in any subject registered under Honors programme or (ii) fails in any subject registered under Honors programme or
b) fails to meet the 7.0 CGPA requirement at any point after registration,
she will be dropped from the list of students eligible for degree with Honors and they will receive B.Tech. degree only. However, such students will receive a separate grade sheet mentioning the additional courses completed by them (implementation shall be in line with the guidelines of APSCHE / affiliating University).

x) If a student gets detained due to attendance shortage / credit shortage in the regular programme, her admission in Honors shall stand cancelled.

xi) The Honors must be completed simultaneously with regular B.Tech. program within four years.

xii) The nomenclature and mention of title on the degree certificate for Honors / Minor will be in accordance with guidelines from the affiliating University.

25. Credit Transfer Policy and guidelines for courses under MOOCs (including SoCs):

i) Adoption of MOOCs is mandatory, as envisaged in the NEP 2020. As per University Grants Commission (Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2016, the Institution allows up to a maximum of 20% of the total credits (i.e., 32 Credits out of a total 160 credits) from elective courses under MOOCs during B.Tech. programme. Every student shall mandatorily complete a minimum of one course under MOOCs.

ii) Each of the 2 credit / 3 credit courses under MOOCs shall be of minimum 12 weeks duration, respectively. One faculty in-charge will be nominated for each course to monitor the registration and progression of the student. Attendance will not be counted for courses under MOOCs.

iii) The Head of the Department shall notify the list of such courses in advance. The student has to pursue and acquire a certificate for a course under MOOCs from the organizations / agencies approved by the BoS in order to earn the credits.

iv) The students may also be permitted to register for a course under MOOCs ahead of the corresponding regular semester based on the start dates of course by external agencies.

v) If a course under MOOCs is not offered during the specified semester, the same or equivalent course under MOOCs may be offered in blended mode.

vi) If the external agency is unable to conduct examination or give grades/marks due to any unavoidable circumstances, the college shall conduct examination and give grades/marks.

vii) In case a student fails in any course under MOOCs offered by college in blended mode, she shall appear in supplementary examination as and when conducted by the college.

viii) In case a student fails in any course under MOOCs offered by external agency, she may be permitted to register for the same or equivalent or any other course approved in BoS.

ix) The grades / marks given for a course under MOOCs by external agencies will be converted to the equivalent grades / marks of GVPCEW(A).

x) If the external agency declares only Pass without any grade / marks for a course under MOOCs, the college will award minimum grade corresponding to Pass criteria.

26. Academic Bank of Credits (ABC):

The Institution will implement Academic Bank of Credits (ABC) inline with the Affiliating University to promote flexibility in curriculum as per NEP 2020 to

i) provide option of mobility for learners across the universities of their choice. In case of students seeking admission through transfer from other institutes, for the credits earned so far and available in the ABC, equivalences will be drawn with the Course structure in force as per the prevailing regulations and will be considered for transfer of credits as per the approvals of BoS and Academic Council. The decision of the Academic Council is final in case of any ambiguity.

ii) provide option to gain the credits through MOOCs from approved digital platforms.

iii) facilitate award of certificate/diploma/degree in line with the accumulated credits in ABC

iv) execute Multiple Entry and Exit system with credit count, credit transfer and credit acceptance from students' account.

27. Multiple Entry / Exit Option:

(a) **Exit Policy:**

The students can choose to exit the four-year programme at the end of the first / second / third year.

i) UG Certificate in (Field of study/discipline) - Programme duration: First year (first two semesters) of the undergraduate programme, 40 credits (39 credits at the end of I year and another course for 1 credit), followed by an additional exit 10-credit bridge course(s) lasting two months, including at least 6- credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

ii) UG Diploma (in Field of study/discipline) - Programme duration: First two years (first four semesters) of the undergraduate programme, 80.5 credits followed by an additional exit 10- credit bridge course(s) lasting two months, including at least 6- credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

iii) Bachelor of Science (in Field of study/discipline) i.e., B.Sc. Engineering in (Field of study/discipline)- Programme duration: First three years (first six semesters) of the undergraduate programme, 124 credits.

(b) Entry Policy:

Modalities on multiple entry by the student into the B.Tech. programme will be as per the directions of the affiliating University and regulatory authorities from time to time.

28. Student Transfers:

Student transfers shall be as per the guidelines issued by the Government of Andhra Pradesh and the concerned Universities from time to time.

General:

i) The academic regulations should be read as a whole for the purpose of any interpretation.

ii) In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman, Academic Council is final.

iii) The College may change or amend the Academic regulations or syllabi at any time as per the directions of the Academic Council and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the College.

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ACADEMIC REGULATIONS
FOR STUDENTS ADMITTED THROUGH LATERAL ENTRY

The duration of the programme for the degree of B.Tech. for lateral entry students will be three academic years, with two semesters in each year. However, if a student cannot complete within 3 years, she can do so by taking more time but not more than 6 years from the year of first admission.

1. Structure of the Programme:

<table>
<tr><th>Semester</th><th colspan="2">Composition</th><th>Credits</th></tr>
<tr><td>III</td><td>5 Theory + 3 Labs + 1 skill Lab
[20-21.5 Credits]</td><td rowspan="2">Includes
Non-Credit Mandatory Courses
PEUHV & NCC/NSS/ES</td><td rowspan="2">41.5 Credits</td></tr>
<tr><td>IV</td><td>5 Theory + 2 Labs + 1 skill Lab
[20-21.5 Credits]</td></tr>
<tr><td colspan="4">Intern-I: 2 Months Community oriented Internship (CSP-Mandatory) during summer vacation</td></tr>
<tr><td>V</td><td>3 Theory + 2 Labs +
1 PE+ 1 OE + 1 skill course +
Internship-I [22-23.5 Credits]</td><td rowspan="2">Includes
Non-Credit Mandatory
Courses</td><td rowspan="2">43.5 Credits</td></tr>
<tr><td>VI</td><td>3 Theory + 3 Labs
+ 1 PE + 1 OE + 1 skill course
[20-21.5 Credits]</td></tr>
<tr><td colspan="4">Intern-II: 2 Months Industrial/Research Internship (Mandatory) during summer vacation</td></tr>
<tr><td>VII</td><td>3 PE + 2 OE +1 HSSE+1 skill
course + Industrial Internship-II
[22 credits]</td><td></td><td>22 Credits</td></tr>
<tr><td>VIII</td><td>Project work / Internship in
Industry
[14 credits]</td><td></td><td>14 Credits</td></tr>
<tr><td colspan="3">Total Credits for Lateral programme</td><td>121Credits</td></tr>
</table>

Non-credit Mandatory Courses: Environmental Sciences, Human Values & Professional Ethics, Indian Constitution, Essence of Indian Traditional Knowledge

2. Promotion Rules:

A student shall fulfill the minimum attendance requirements in every semester for promotion to next semester.

3. Minimum Academic Requirement for the award of degree:

A. Eligibility for the award of degree:

A student shall be eligible for the award of the B.Tech. degree/ B.Tech. degree with Minor if

she fulfills the following conditions:

i) Register and successfully complete all the courses prescribed within the stipulated period.
ii) Earn 121 credits for B.Tech. degree/ earn 12 credits within 121 credits for B.Tech. with Minor degree and pass in all non-credit mandatory courses
iii) Secure satisfactory grade in social activity
iv) No disciplinary action is pending against her
v) Pays the prescribed fee for all the years.

B. Eligibility for the award of degree with Honors:

A student shall be eligible for the award of degree with Honors in a specific specialization if she satisfies conditions i, iii, iv, v cited above (3.A) and earns 15 credits in addition to 121 Credits.

4. All other regulations shall be same as that of the regulations applicable to regular students.

General:

i) The academic regulations should be read as a whole for the purpose of any interpretation.
ii) In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman, Academic Council is final.
iii) The College may change or amend the Academic regulations or syllabi at any time as per the directions of the Academic Council and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the College.

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TRANSITORY REGULATIONS
FOR RE-ADMITTED STUDENTS

i) When a student is detained due to lack of credits / shortage of attendance, she may be re-admitted after fulfillment of academic requirements and as and when the semester is offered. In such case, she will be in the academic regulations into which she is readmitted.

ii) Credit equivalences will be drawn for the students re-admitted into latest regulations from the earlier regulations. A Student has to register for the substitute / compulsory / pre-requisite courses identified by the respective Boards of Studies.

iii) The student has to register for substitute courses, attend the classes and pass in examination and earn the credits.

iv) The student has to register for compulsory courses, attend the classes and pass in examination

v) For the subject(s) failed in earlier semesters (before re-admission), the student has to acquire credits from the supplementary examinations as and when conducted.

vi) In the case of transferred students from other University / College, an equivalent course structure shall be prepared by the BoS of the respective department considering the suitable credits already acquired at the previous institution.

vii) The students detained in earlier Regulations (under JNTU-K affiliation) and to be readmitted into R-24 Regulations (under AU affiliation) shall also follow the above guidelines subject to the approval from both the Universities.

viii) The decision of the Principal is final on any other clarification in this regard.

General:

i) The academic regulations should be read as a whole for the purpose of any interpretation.

ii) In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman, Academic Council is final.

iii) The College may change or amend the Academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the College.

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MALPRACTICES RULES
DISCIPLINARY ACTION FOR - IMPROPER CONDUCT IN EXAMINATIONS

S No	Nature of Malpractices/Improper conduct *If the candidate:*	Suggested Punishment
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which she is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellationof the performance in that subject only.
1. (b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, she will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled.
3.	Impersonates any other candidate in connectionwith the examination.	The candidate who has impersonated shall be expelledfrom examination hall. The candidate is also debarredand forfeits the seat. The performance of the originalcandidate who has been impersonated, shall be cancelledin all the subjects of the examination (includingpracticals and project work) already appeared and shall not be allowed to appear for examinations of theremaining subjects of that semester/year. The candidateis also debarred for two consecutive semesters from classwork and all examinations. The continuation of thecourse by the candidate is subject to the academic regulations in connection with forfeiture of seat. If theimposter is an outsider, she will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation ofperformance in that subject and all the other subjects thecandidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjectsof that semester/year. The candidate is also debarred fortwo consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.

S No	Nature of Malpractices/Improper conduct If the candidate:	Suggested Punishment
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requestinghim to award pass marks.	Cancellation of the performance in that subject.
.6	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in- charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects thecandidate(s) has (have) already appeared and shall notbe permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.

S No	Nature of Malpractices/Improper conduct If the candidate:	Suggested Punishment
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the college expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Committee appointed by the Principal for further action and impose suitable punishment.	

Suitable punishment shall be awarded based on the recommendations of a committee constituted in this regard.

* * * * *

Principal
G V.P College of Engineering (a)
Madhurawada
Visakhapatnam-530

Ragging

Prohibition of ragging in educational institutions Act 26 of 1997

Salient Features

- Ragging within or outside any educational institution is prohibited.
- Ragging means doing an act which causes or is likely to cause Insult or Annoyance of Fear or Apprehension or Threat or Intimidation or outrage of modesty or Injury to a student.

	Imprisonment upto		Fine Upto
Teasing, Embarrassing and Humiliation	6 Months	+	Rs. 1,000/-
Assaulting or Using Criminal force or Criminal intimidation	1 Year	+	Rs. 2,000/-
Wrongfully restraining or confining or causing	2 Years	+	Rs. 5,000/-
Causing grievous hurt, kidnapping or Abducts or rape or committing unnatural offence	5 Years	+	Rs. 10,000/-
Causing death or abetting suicide	10 Months	+	Rs. 50,000/-

Ragging

ABSOLUTELY NO TO RAGGING

1. Ragging is prohibited as per Act 26 of A.P. Legislative Assembly, 1997.
2. Ragging entails heavy fines and/or imprisonment.
3. Ragging invokes suspension and dismissal from the College.
4. Outsiders are prohibited from entering the College and Hostel without permission.
5. Girl students must be in their hostel rooms by 7.00 p.m.
6. All the students must carry their Identity Cards and show them when demanded
7. The Principal and the Wardens may visit the Hostels and inspect the rooms any time.

ANNEXURE - III

ACADEMIC RULES AND REGULATIONS (R-24)

FOR M.TECH. PROGRAMMES

[Under Choice Based Credit System in line with NEP 2020]

[Effective from 2024-25 admitted batch)

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)
MADHURAWADA, VISAKHAPATNAM 530048
AFFILIATED TO ANDHRA UNIVERSITY, VISAKHAPATNAM

ACADEMIC REGULATIONS

FOR M.TECH. PROGRAMMES

(Under Choice Based Credit System effective from 2024-25 admitted batch)

These Regulations shall be called the "Gayatri Vidya Parishad College of Engineering for Women (Autonomous) Regulations- 2024 for the Award of M. Tech. Degree".

These regulations shall be applicable for students enrolling for M.Tech. Degree programmes at the Institute from Academic Year 2024-25.

Admission to the above program shall be made subject to the eligibility, qualifications and specialization as per the guidelines prescribed by the APSCHE, AICTE and Andhra University from time to time. The medium of instruction for course work and examinations at the Institute shall be English.

The duration of the programme for the Master of Technology degree will be two academic years, with two semesters in each year. However, if a student cannot complete within 2 years, she can do so by taking more time but not more than 4 years from the year of first admission.

1. Structure of the Programme:

Semester	No. of courses & Corresponding Credits		Credits
I	2 Theory + PE-I + PE-II + Research Methodology & IPR + Audit course+2 Core Lab	2*3 + 3 + 3 + 2 + 2*1.5	17
II	2 Theory + PE-III + PE-IV + Audit course + 2 Core Lab + 1 Mini Project with Seminar	2*3 + 3 + 3 + 2 *2+1.5	17
III	PE-V+OE+ Dissertation (Phase-I) + Industrial Training	1*3 + 1*3 + 10+2	18
IV	Dissertation (Phase-II)	16	16
		TOTAL	68

PE: Professional Elective; **OE**: Open Elective

The credits are allotted as:
1 Hr. Lecture (L) per week - 1 credit
1 Hr. Practical (P) per week - 0.5 credits.
Audit Courses carry no credits.

2. Registration:

A student shall register for courses in each semester at the beginning, from I semester onwards according to the choice provided and courses offered by the concerned department.

3. Attendance Requirements:

i) A student shall be eligible to appear for end semester examinations if she acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester.

- In the case of students who participate in activities like NSS, NCC, sports, intercollegiate tournaments conducted at National level/State Level/ University Level with prior approval of the Principal, the candidate may be deemed to have attended the college during the actual period of such activity, solely for the purpose of attendance.
- Participating in the seminar, workshop, conference with prior approval of the Principal, the candidate may be deemed to have attended the college during the actual period of such activity, solely for the purpose of attendance permission. The maximum period of such events is limited to 10 days.
- In the case of students admitted under special circumstances (late admission / transfer etc.,), the candidate shall attend at least 50% of the total classes held during semester and shall have attended at least 75% of the total classes held from the date of admission.

ii) Condonation for shortage of attendance in aggregate up to 10% (greater than 65% and less than75%) in each semester may be granted on medical grounds. A stipulated fee shall be payable to the college towards condonation of shortage of attendance.

iii) Students whose shortage of attendance is not condoned in any semester are detained and are not eligible to take their end semester examination of that class and their registration shall stand cancelled.

iv) A student will not be promoted to the next semester unless she satisfies the attendance requirements of the present semester, as applicable. They shall seek readmission and continue her course of study from that semester when offered next.

4. Method of Evaluation:

The performance of a student in each semester shall be evaluated through Continuous Internal Evaluation and End Semester Examination. The student shall earn the credits in the respective courses by obtaining at least the marks as specified in the pass criteria given below:

S.No	Type of Course	Continuous Internal Evaluation	End Semester Examination (3 hours)		Pass Criteria
			Max Marks	Evaluation	
1.	Professional core/ Professional Elective/ Open Elective/ Research Methodology & IPR Courses	30 Marks Evaluation process: 20 marks (Two internal tests each for 20 marks.) 10 marks (Two assessments 1 before mid1 and 1 before mid2 by at least any	70 Marks (Through a panel of paper setters)	Professional core (Double Valuation) and Professional Elective/ Open Elective/ Research Methodology & IPR Courses (Single Valuation)	**40% (28 marks) from End semester and 50% (50 marks) on aggregate from Internal and End semester Examination**

		two of the following methods each for 10 marks. (Assessment Methods: Assignment / Term paper / / seminar / Case study / Projects /Any other Teacher specific method). 2:1 weighted averaged marks with the higher score carrying a weightage of 2 shall be considered.			**put together.**
5.	Practical Courses	50 Marks 20 marks (day-wise performance including observation, viva & record) 30 marks (from internal examinations at the end of the semester).	50 Marks (Internal)	Single Valuation (Based on report of a lab activity-based project on the course conducted by concerned teacher and a senior expert in the subject from the same department)	**50% (25 marks) from End semester Examination and 50% (50 marks) on aggregate from Internal and End semester Examinations put together.**
6.	Non-credit Audit courses	100 Marks	-	Single Valuation	**40% (40 Marks) from End Semester Examination.** **No marks or letter grade shall be allotted for all the non-credit Audit courses.**

7.	Mini Project with Seminar	100 Marks	-	Single Valuation Through an Internal committee (comprising of HoD, Supervisor and a senior faculty of the department) based on Report (50%), Presentation and Viva-voce (50%).	**50% (50 Marks) from Report, Presentation and Viva-voce.**
8.	Dissertation work Phase I & II	Phase I (100 marks) Phase II (30 marks) (details mentioned in point 5 g & h)	Phase II (70 marks)	Single Valuation Through a board consisting of the supervisor, Head of the Department and the external examiner	**PASS in both Phase I & II**

Note 1: If a student misses both the mid examinations in an ongoing semester, then on satisfactory medical grounds, she is permitted to take a re-test before external examination of that semester based on either mid-I or mid-II syllabus and 80% of the marks will only be considered.

4.1 (a) Valuation of scripts:

For both single and double valuation, a chief examiner shall be appointed for each theory course to monitor the valuation process and evaluate atleast 10% of scripts per bundle at random for which the marks awarded by the chief examiner shall be final.
In case of double valuation, in addition to the above,

i) If the difference between the first and second valuations is less than or equal to 10 marks (15% of 70 marks), the better of the two valuations shall be awarded.

ii) If the difference between the first and second valuations is more than 10 marks (15% of 70 marks), the chief examiner shall value the script. Out of the three valuations, the average of marks obtained in third valuation and the marks obtained nearer to third valuation out of first two valuations shall be considered.

4.1 (b) Revaluation:

i) Revaluation of any theory subject shall be entertained within a stipulated period on payment of specified fee.

ii) There is no revaluation for any lab subjects/practical subjects/skill-oriented courses.

4.2 Audit Courses:

A student shall register for the audit courses (as approved in BoS) in online (MOOCs) / offline mode and appear for examination to be conducted by the college.

i) The students may be permitted to register for audit course under MOOCs ahead of the corresponding regular semester based on the start dates of course by external agencies.

ii) If the audit course is not offered under MOOCs during the specified semester, the same or its

equivalent course under MOOCs may be offered in blended mode.

4.3 Pedagogy training / Industrial training:

Training shall be for a period of at least 4 weeks during III semester and a report has to be submitted. The assessment shall be carried out for 100 marks by an internal evaluation committee comprising Head of the Department, Faculty advisor and another faculty of the department.

4.4 Supplementary examinations:

Supplementary examinations will be conducted only with the corresponding regular examinations.

If a student fails in final semester Project Work, the student shall appear for supplementary examination as and when conducted.

5. EVALUATION OF DISSERTATION WORK:

Every candidate shall be required to submit the dissertation work after taking up a topic approved by the Departmental Research Committee (DRC).

i) A Departmental Research Committee (DRC) shall be constituted with HoD as Chairman, two senior faculty (at least one from each specialization) as members along with the supervisor to oversee the progress of the dissertation work from selection of topic to submission.

ii) A Central Research Committee (CRC) shall be constituted with a Professor as Chair Person and one representative from each department nominated by the Principal.

iii) Registration of Dissertation Work: A candidate shall register for the Dissertation work at the beginning of the second year, only after satisfying the attendance requirement of all the courses up to II semester. The duration of the dissertation work is for two semesters.

iv) After satisfying 5c, a candidate has to submit, in consultation with the supervisor, the title, objective and plan of action of dissertation work to the DRC for its approval. Only after obtaining the approval of DRC, the student can initiate the dissertation work.

v) Change of topic of the dissertation work or supervisor, if necessary, shall be with the approval of the DRC. In such case, the date of registration for the dissertation work shall be the date of change of Supervisor or topic.

vi) Evaluation of the dissertation work shall be done in two phases, one at the end of the III Semester and the other during the IV Semester.

vii) The evaluation of the dissertation work (Phase-I) at the end of III semester shall be carried out through DRC1 for 100 marks based on the presentation made by the student on the topic selected, literature survey and the progress of the work. The student shall PASS in dissertation work (Phase-I) by securing at least 50 marks. Otherwise, the student shall reappear for DRC1 with improvised work to secure PASS. Only those students who secure a PASS in dissertation work (Phase-I) shall be permitted to proceed for the dissertation work (Phase-II) in IV semester.

viii) The evaluation of the dissertation work (Phase-II) during IV semester shall be carried out for a total of 100 marks through DRC2 (10 marks), DRC3 (10 marks), CRC (10 marks) and final viva-voce examination (70 marks).

ix) A candidate shall be permitted to submit her dissertation only after acquiring credits of

all theory and practical course with the approval of CRC but not earlier than 40 weeks from the date of registration of the Dissertation work. The candidate shall make an oral presentation before the CRC and after the approval by CRC, plagiarism check shall be conducted for the Dissertation (Similarity Index shall not exceed 30%) and shall submit a draft copy to the Principal through the concerned Head of the Department.

x) Three copies of the dissertation certified by the Supervisor shall be submitted in the department after approval by the CRC.

xi) For the purpose of adjudication of the dissertation, an external examiner shall be selected by the Principal or his nominee from a panel of examiners in the program specialization proposed and approved in the BoS meeting.

xii) The final evaluation of dissertation (Phase-II), i.e., viva-voce examination, for 50 marks, shall be conducted by a board consisting of the supervisor, Head of the Department and the external examiner.

xiii) A student is deemed to be passed in dissertation (Phase-II) of IV semester, if he secures at least 25 marks (50%) in the final viva-voce examination and at least 50 marks (50%) out of a total 100 marks through DRC2, DRC3, CRC, and final viva-voce examination. If a student fails in Dissertation (Phase-II), he/she shall revise and resubmit the dissertation, in a time frame prescribed by the CRC.

xiv) The overall Dissertation Grade Point Average (DGPA), shall be computed based on the grade points secured in Phase-I (III semester) and Phase-II (IV semester) as:

xv) $DGPA = \Sigma(Ci \times Gi) / \Sigma Ci$

xvi) where Ci is the number of credits of the ith phase and Gi is the grade point scored by the student in the ith phase.

6. ACADEMIC REQUIREMENTS:

i) A student shall secure a PASS in all courses (except in audit courses) and earn 68 credits to be eligible for the award of the M.Tech. degree.

ii) A student shall register for the audit courses (as approved in BoS) in online / offline mode and appear for examination to be conducted by the college.

7. GRADING SYSTEM:

Absolute grading system shall be followed for the award of grades.

Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale.

Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P and F.

Based on the marks secured, a Letter Grade is awarded as per the following:

Grades and Grade Points

Marks Range		Letter Grade		Grade Point
Theory (including Mandatory courses)	Practical, Drawing, Design Thinking, SoCs, Internships, Project			
> 90 to ≤ 100	> 90 to ≤ 100	O	Outstanding	10
> 80 to ≤ 90	> 80 to ≤ 90	A+	Excellent	9
> 70 to ≤ 80	> 70 to ≤ 80	A	Very Good	8
> 60 to ≤ 70	> 60 to ≤ 70	B+	Good	7
> 55 to ≤ 60	> 55 to ≤ 60	B	Above Average	6
≥ 50 to ≤ 55	≥ # 50 to ≤ 55	C	Average	5
≥ *40 to < 50	-	P	Pass	4
< 40	-	F	Fail	0
		Ab	Absent	0

* Pass mark for Theory courses, # Pass mark for all other courses

Calculation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

i) The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.

$$SGPA = \Sigma (Ci \times Gi) / \Sigma Ci$$

where, Ci is the number of credits of the ith subject and Gi is the grade point scored by the student in the ith course

ii) The CGPA will be computed in the same manner taking into account all the courses undergone by a student over all the semesters of a program, i.e.

$$CGPA = \Sigma (Ci \times Si) / \Sigma Ci$$

where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester. CGPA is calculated from II semester onwards up to the final semester, considering all the courses offered from the First semester onwards.

iii) Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts. CGPA is calculated for those who clear all the courses including present semester.

iv) While computing the SGPA/CGPA, the subjects in which the student is awarded Zero grade points will also be included.

v) A candidate has to secure a minimum of 6.0 SGPA for a pass in each semester.

The award of CLASS / DIVISION is as per the following:

Class Awarded	CGPA Secured
First class with distinction	≥ 7.0 (within two years and without any supplementary appearance in any semester)
First class	≥ 6.0 and < 7.0

CGPA to Percentage of Marks: Equivalent percentage of marks = **CGPA*10**

8. AWARD OF M.TECH. DEGREE:

A student shall be declared eligible for the award of the M.Tech. degree, if she pursues the course of study and satisfies the following:

i) Earn 68 credits in not less than two academic years and not more than four academic years from the year of first admission.
ii) Earn a minimum of 6.0 CGPA from all courses.
iii) No disciplinary action pending against her.
iv) Pays the prescribed fee for all the years.

9. WITHHOLDING OF RESULT:

The result of a student in a semester shall be withheld and not declared if the student has disciplinary action pending against her.

TRANSITORY REGULATIONS

i) When a student is detained due to lack of credits / shortage of attendance, she may be re-admitted after fulfillment of academic requirements and as and when the semester is offered. In such case, she shall be in the academic regulations into which she is readmitted.

ii) Credit equivalences shall be drawn for the students re-admitted into latest regulations from the earlier regulations. A Student has to register for the substitute / compulsory / pre-requisite courses identified by the respective Boards of Studies.

iii) The student has to register for substitute courses, attend the classes and pass in examination and earn the credits.

iv) The student has to register for compulsory courses, attend the classes and pass in examination.

v) For the subject(s) failed in earlier semesters (before re-admission), the student has to acquire credits from the supplementary examinations as and when conducted.

vi) In case of transferred students from other University / College, an equivalent course structure shall be prepared by the BoS of the respective department considering the suitable credits already acquired at the previous institution.

vii) The decision of the Principal will be final on any other clarification in this regard.

General:

i) The academic regulation should be read as a whole for the purpose of any interpretation.

ii) In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman, Academic Council is final.

iii) The college may change or amend the academic regulations or syllabi from time to time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the college.

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MALPRACTICES RULES
DISCIPLINARY ACTION FOR - IMPROPER CONDUCT IN EXAMINATIONS

S No	Nature of Malpractices/Improper conduct	Suggested Punishment
	If the candidate:	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which she is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellationof the performance in that subject only.
1. (b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, she will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled.
3.	Impersonates any other candidate in connectionwith the examination.	The candidate who has impersonated shall be expelledfrom examination hall. The candidate is also debarredand forfeits the seat. The performance of the originalcandidate who has been impersonated, shall be cancelledin all the subjects of the examination (includingpracticals and project work) already appeared and shall not be allowed to appear for examinations of theremaining subjects of that semester/year. The candidateis also debarred for two consecutive semesters from classwork and all examinations. The continuation of thecourse by the candidate is subject to the academic regulations in connection with forfeiture of seat. If theimposter is an outsider, she will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation ofperformance in that subject and all the other subjects thecandidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjectsof that semester/year. The candidate is also debarred fortwo consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.

S No	Nature of Malpractices/Improper conduct	Suggested Punishment
	If the candidate:	
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
.6	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.

S No	Nature of Malpractices/Improper conduct If the candidate:	Suggested Punishment
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the college expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Committee appointed by the Principal for further action and impose suitable punishment.	

Suitable punishment shall be awarded based on the recommendations of a committee constituted in this regard.

* * * * *

Principal
V.P College of Engineering for Wo
Madhurawada
Visakhapatnam-530048

Ragging

Prohibition of ragging in educational institutions Act 26 of 1997

Salient Features

- Ragging within or outside any educational institution is prohibited.
- Ragging means doing an act which causes or is likely to cause Insult or Annoyance of Fear or Apprehension or Threat or Intimidation or outrage of modesty or Injury to a student.

	Imprisonment upto		Fine Upto
Teasing, Embarrassing and Humiliation	6 Months	+	Rs. 1,000/-
Assaulting or Using Criminal force or Criminal intimidation	1 Year	+	Rs. 2,000/-
Wrongfully restraining or confining or causing	2 Years	+	Rs. 5,000/-
Causing grievous hurt, kidnapping or Abducts or rape or committing unnatural offence	5 Years	+	Rs. 10,000/-
Causing death or abetting suicide	10 Months	+	Rs. 50,000/-

Ragging

ABSOLUTELY NO TO RAGGING

1. Ragging is prohibited as per Act 26 of A.P. Legislative Assembly, 1997.
2. Ragging entails heavy fines and/or imprisonment.
3. Ragging invokes suspension and dismissal from the College.
4. Outsiders are prohibited from entering the College and Hostel without permission.
5. Girl students must be in their hostel rooms by 7.00 p.m.
6. All the students must carry their Identity Cards and show them when demanded
7. The Principal and the Wardens may visit the Hostels and inspect the rooms any time.

MINUTES OF THE **SECOND MEETING OF THE ACADEMIC COUNCIL OF GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN (AUTONOMOUS)** HELD ON 26th October 2024 AT 10.00 AM IN THE COLLEGE CAMPUS, MADHURAWADA, VISAKHAPATNAM

Members present:

1. Prof. Dr. Raj Kumar Goswami, Principal, GVPCEW (A)	Chairman
2. Dr. G. Sudheer, Professor & Vice-Principal, GVPCEW (A)	
3. Dr. P. V. S. L. Jagadamba, Chairperson, BoS & Head, Dept. of CSE	
4. Dr. D. K. Bebarta, Chairman, BoS, Head, Dept. of CSE (AIML)	
5. Dr. M Bhanu Sridhar, Chairman, BoS, Dept. of IT	
6. Dr. P. Murali Krishna Prasad, Chairman, BoS, Dept. of ECE	
7. Dr. R. V. S. Lakshmi Kumari, Chairperson, BoS, Dept. of EEE	
8. Dr. K. L. Sai Prasad, Chairman, BoS, Dept. of BSH	
9. Dr. D.V.A.N Ravi Kumar, Associate Prof., Dept. of ECE	(Teacher of the College)
10. Dr. N Sharmili, Associate Professor, Dept. of CSE	(Teacher of the College)
11. Prof. Dr. P. Mallikarjuna Rao, Dept of Electrical & Electronics Engineering AU College of Engineering, Visakhapatnam	(University Nominee)
12. Prof. Dr. S. Vizianandа Row Dept of Computer Science & Systems Engineering AU College of Engineering, Visakhapatnam	(University Nominee)
13. Prof. Dr. G. Sasibhusana Rao Dept of Electronics & Communication Engineering AU College of Engineering, Visakhapatnam	(University Nominee)
14. Dr. C. Srinivas, Associate Professor, Dept. of IT	Controller of Examinations
15. Ms. Ch. Sirisha, Asst Prof, Dept. of ECE	Member Secretary

Online Meeting: The following members have joined online with prior approval from the Chair.

(Video call link: https://meet.google.com/kqe-inqp-qhh)

1. Ms. Lakshmi Mukkavalli, Managing Director, Patra India (Expert – Industry)
2. Sri Pavan Kumar Allu, Technology Head at AI.Cloud for Lifesciences, TCS (Expert-Industry)
3. Ms. Pooja Vidya Shankar, Head-Strategic Planning NASCOMM Centre of Excellence IoT & AI (Expert – Engineering)
4. Sri P Prabhakar, Superintending Engineer, APTRANSCO (Expert-Industry)

Leave of absence: The following members/special invitees of Governing Body were granted prior approval from the Chair to be excused from the meeting

1. Dr. V. Sujatha, MD, DM (Cardiology) (Expert – Medicine)
2. Dr. P Devendra, Associate Prof., Dept of EEE (Teacher of the College)
3. Dr. K. Purushotham Naidu, Asst Prof., Dept of CSE (AIML) (Teacher of the College)

The meeting commenced in a hybrid format (online & offline) with a welcome note from the chairman.

Item- 1 : Confirmation of the Minutes of the Meeting of the 1st Academic Council Meet

The member Secretary informed all the distinguished members of the academic council that the minutes were circulated (both soft copy and hard copy) after incorporating the suggestions given by the esteemed members.

The members were requested to confirm the minutes of the 1st meeting.

Resolution No. GVPCEW (A)-AC-II/10/24/1

The minutes of the 1st meeting of the Academic Council held on 27.07.2024 are confirmed.

Item-2 : Chairman Address

The chairman presented the main activities of the institute and its achievements since the previous meeting.

The members expressed their satisfaction at the conduct of events and requested the chairman to convey their best wishes to all the faculty and students for their active participation. The members also requested the chairman to convey their commendations to the achievers.

Resolution No. GVPCEW (A)-AC-II/10/24/2

The members appreciated the faculty, Students and Staff for their achievements.

Item-3 : Minor changes in the Academic Rules and Regulations R24 for B. Tech Programs in line with the guidelines of AICTE

The Member Secretary presented the following proposed modifications to be brought into R24 regulation in line with the guidelines of AICTE and guidelines from the Affiliating University

- For the award of a B.Tech. Degree with Minor, a student must satisfy conditions (i), (iii), (iv), and (v) of Section 17.A in the Academic Rules and Regulations (R24) and earn an additional 12 credits beyond the required 160 credits.

Resolution No. GVPCEW (A)-AC-II/10/24/3

The members agreed to amend R24 to ensure Minor degree requirements align with AICTE and Affiliating University guidelines, as specified in Annexure-1.

Item-4 : Minutes of the meeting of the BoS of different departments held on 3rd August, 2024

The Member Secretary presented the agenda items that were discussed in the Board of Studies meeting of different departments and sought approval of the Academic Council for the minutes with the following major items:

1. Course Structure of CSE, CSE (AI&ML) & IT for B. Tech I year- I & II Sem recommended by Board of Studies of CSE, CSE (AI&ML) & IT.

2. Syllabi of the courses for B. Tech I Year (Semesters I & II), as recommended by the Board of Studies (BoS) of CSE, CSE (AI&ML), and IT.

S.No	List of Courses	Course Code
1	Python Programming	24CT11RC06
2	Fundamentals of Computers	24CT11RC01
3	Python Programming Lab	24CT11RC07
4	Computer Engineering Workshop	24CT11RC03
5	Problem Solving using C	24CT11RC02
6	Web Technologies Fundamentals Lab	24CT11RC08
7	Problem Solving using C Lab	24CT11RC04
8	IT Essentials Lab	24CT11RC05

3. Course Structure of ECE for B. Tech I year- I & II Sem recommended by Board of Studies of ECE.

4. Syllabi of the courses for B. Tech I Year (Semesters I & II), as recommended by the Board of Studies of ECE.

S.No	List of Courses	Course Code
1	Electronic Devices and Circuits	24EC11RC01
2	Electronic Devices and Circuits Lab	24EC11RC02
3	Basic Electronics Engineering	24EC11RC03
4	Elements of Electronics Engineering	24EC11RC04
5	Digital Logic Design	24EC11RC05
6	Electronic Circuit Analysis	24EC11RC06
7	Digital Logic Design Lab	24EC11RC07
8	Electronic Circuit Analysis Lab	24EC11RC08

5. Course Structure of EEE for B. Tech I year- I & II Sem recommended by Board of Studies of EEE.

6. Syllabi of the courses for B. Tech I Year (Semesters I & II), as recommended by the Board of Studies of EEE.

S.No	List of Courses	Course Code
1	Fundamentals of Electrical Engineering	24EE11RC01
2	Electrical Circuits 1	24EE11RC03
3	Thermal and Hydro Prime Movers	24EE11RC04
4	Electrical Engineering Workshop	24EE11RC05
5	Network Theory and Machines	24EE11RC02

7. Syllabi of the courses for B. Tech I Year (Semesters I & II), as recommended by the Board of Studies of Mathematics.

S.No	List of Courses	Course Code
1	Calculus and Differential Equations	24BM11RC01
2	Linear Algebra and Vector Calculus	24BM11RC02

8. Syllabi of the courses for B. Tech I Year (Semesters I & II), as recommended by the Boards of Studies of Physics.

S.No	List of Courses	Course Code
1	Engineering Physics	24BP11RC01
2	Engineering Physics Lab	24BP11RC02

9. Syllabi of the courses for B. Tech I Year (Semesters I & II), as recommended by the Board of Studies of Chemistry.

S.No	List of Courses	Course Code
1	Green Chemistry	24BC11RC01
2	Green Chemistry Lab	24BC11RC02

10. Syllabi of the courses for B. Tech I Year (Semesters I & II), as recommended by the Board of Studies of English.

S.No	List of Courses	Course Code
1	English	24HE11RC01
2	Communication Skills Lab	24HE11RC02

11. Course Structure for M. Tech I year- I & II Sem of CSE- Data Science recommended by Board of Studies of CSE.

12. Syllabi of the courses for M. Tech I Year (Semesters I & II), as recommended by the Board of Studies of CSE.

S.No	List of Courses	Course Code
1	Introduction to Data Science	24CS21RC01
2	Cloud Computing and Virtualization	24CS21RC02
3	Big Data Analytics	24CS21PE1A
4	Computational Linear Algebra	24CS21PE1B
5	Soft Computing	24CS21PE1C

6	Computational Biology	24CS21PE1D
7	Internet of Things	24CS21PE1E
8	Cyber Security for Data Science	24CS21PE2A
9	Optimization Techniques for Data Science	24CS21PE2B
10	Time Series data Analysis	24CS21PE2C
11	Natural Language Processing	24CS21PE2D
12	Statistical Modeling	24CS21PE2E
13	Data Science Applications with Python Lab	24CS21RC03
14	Cloud Computing and Big Data Analytics Lab	24CS21RC04
15	Machine Learning	24CS21RC05
16	Data Visualization	24CS21RC06
17	Image and Video Analytics	24CS21PE3A
18	Social Media Analytics	24CS21PE3B
19	Deep Learning	24CS21PE3C
20	Business Analytics	24CS21PE3D
21	High Performance Computing	24CS21PE3E
22	Geographic Information System	24CS21PE4A
23	Block Chain Technology	24CS21PE4B
24	Secure Software Design	24CS21PE4C
25	Data Storage Technologies and Networks	24CS21PE4D
26	Information Retrieval Systems	24CS21PE4E
27	Machine Learning Lab	24CS21RC07
28	Data visualization using Tableau Lab	24CS21RC08
29	Mini Project with Seminar	24CS21PR01

13. Course Structure for M. Tech I year- I & II Sem of VLSI Design and Embedded Systems recommended by Board of Studies of ECE.

14. Syllabi of the courses for M. Tech I Year (Semesters I & II), as recommended by the Board of Studies of ECE.

S.No	List of Courses	Course Code
1	Analog and Digital CMOS VLSI Design	24EC21RC01
2	Embedded Systems Design	24EC21RC02
3	Application Specific Integrated Circuit (ASIC)	24EC21PE1A
4	Advanced Operating Systems	24EC21PE1B
5	Parallel Processing	24EC21PE1C
6	CPLD and FPGA Architectures & Applications	24EC21PE2A
7	Electronic Design Automation Tools	24EC21PE2B
8	Digital System Design	24EC21PE2C
9	Analog and Digital CMOS VLSI Design Lab	24EC21RC03
10	Embedded system Design Lab	24EC21RC04
11	RTL Design & Verification using System Verilog	24EC21RC05
12	Internet of Things and its Applications	24EC21RC06
13	Low Power VLSI Design	24EC21PE3A
14	System on Chip Design	24EC21PE3B
15	Digital Signal and Image Processing	24EC21PE3C
16	Communication Buses and Interfaces	24EC21PE4A
17	Design for Testability	24EC21PE4B
18	DSP Processors and Architectures	24EC21PE4C
19	RTL Design & Verification using System Verilog Lab	24EC21RC07
20	Internet of Things and its Applications Lab	24EC21RC08
21	Mini Project with Seminar	24EC21PR01

15. Syllabi of the courses for M. Tech I Year (Semesters I & II), as recommended by the Board of Studies of Management Science.

S.No	List of Courses	Course Code
1	Research Methodology & IPR	24HM21AC01
2	Organizational Behavior	24HM21AC02
3	Entrepreneurship	24HM21AC03

The members were requested to confirm the minutes of the BoS meetings of different Departments.

Resolution No. GVPCEW (A)-AC-II/10/24/4.i

The academic council members resolved to approve the B.Tech Degree course structures recommended by Board of Studies(BoS) of the following Departments, as specified in the Annexure-2:

1. Computer Science and Engineering (CSE)
2. Computer Science and Engineering (Artificial Intelligence & Machine Learning) (CSE-AI&ML)
3. Information Technology (IT)
4. Electronics and Communication Engineering (ECE)
5. Electrical and Electronics Engineering (EEE)

Resolution No. GVPCEW (A)-AC-II/10/24/4.ii

The academic council members resolved to approve the M.Tech degree course structures recommended by the Board of Studies(BoS) for the following programs, as specified in the Annexure-3:

1. M.Tech in Computer Science and Engineering (Data Science)
2. M.Tech in Electronics and Communication Engineering (VLSI Design & Embedded Systems)

Resolution No. GVPCEW (A)-AC-II/10/24/4.iii

The Academic Council members resolved to approve the syllabi of the courses for B. Tech I Year (Semesters I & II), as recommended by the Boards of Studies (BoS) of CSE, CSE (AI&ML), and IT, as specified in the Annexure-4.

Resolution No. GVPCEW (A)-AC-II/10/24/4.iv

The Academic Council members resolved to approve the syllabi of the courses for B. Tech I Year (Semesters I & II), as recommended by the Board of Studies (BoS) of ECE, as specified in the Annexure-5.

Resolution No. GVPCEW (A)-AC-II/10/24/4.v

The Academic Council members resolved to approve the syllabi of the courses for B. Tech I Year (Semesters I & II), as recommended by the Board of Studies (BoS) of EEE, as specified in the Annexure-6.

Resolution No. GVPCEW (A)-AC-II/10/24/4.vi

The Academic Council members resolved to approve the syllabi of the courses for B. Tech I Year (Semesters I & II), as recommended by the Board of Studies (BoS) of Mathematics, as specified in the Annexure-7.

Resolution No. GVPCEW (A)-AC-II/10/24/4.vii

The Academic Council members resolved to approve the syllabi of the courses for B. Tech I Year (Semesters I & II), as recommended by the Board of Studies (BoS) of Physics, as specified in the Annexure-8.

Resolution No. GVPCEW (A)-AC-II/10/24/4.viii

The Academic Council members resolved to approve the syllabi of the courses for B. Tech I Year (Semesters I & II), as recommended by the Board of Studies (BoS) of Chemistry, as specified in the Annexure-9.

Resolution No. GVPCEW (A)-AC-II/10/24/4.ix

The Academic Council members resolved to approve the syllabi of the courses for B. Tech I Year (Semesters I & II), as recommended by the Board of Studies (BoS) of English, as specified in the Annexure-10.

Resolution No. GVPCEW (A)-AC-II/10/24/4.x

The Academic Council members resolved to approve the syllabi of the courses for M. Tech I Year (Semesters I & II), as recommended by the Board of Studies (BoS) of CSE, as specified in the Annexure-11.

Resolution No. GVPCEW (A)-AC-II/10/24/4.xi

The Academic Council members resolved to approve the syllabi of the courses for M. Tech I Year (Semesters I & II), as recommended by the Board of Studies (BoS) of ECE, as specified in the Annexure-12.

Resolution No. GVPCEW (A)-AC-II/10/24/4.xii

The Academic Council approved the M.Tech I Year (Semesters I & II) syllabi, as recommended by the Board of Studies (BoS) of Management Science, as specified in the Annexure-13.

Item-5 : Any other matter

- During the discussion, members suggested that students in the CSE department be allowed to pursue a Minor degree in CSE (AI&ML).

The Vice-Principal Dr. G Sudheer concluded the meeting by thanking the members for their valuable presence and contribution.

Chairman of the Meeting
Academic Council

Annexure-1

NOTICE OF AMENDED REGULATION

October 26, 2024

Gayatri Vidya Parishad College of Engineering for Women (Autonomous)

Madhurawada, Kommadi
Visakhapatnam-530048

ACADEMIC RULES & REGULATIONS (R-24)
FOR B.TECH. PROGRAMMES INCLUDING HONORS AND MINORS

[Under Choice Based Credit System in line with NEP 2020]

[Effective from 2024-25 admitted batch]

SUMMARY

The proposed regulation amendment includes changes to the Award of B. Tech Degree with Minor, in accordance with the AICTE 2024-25 guidelines.

MEETING DATE

October 26, 2024

Academic Council

GVPCEW(A)

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN (AUTONOMOUS)

MADHURAWADA, VISAKHAPATNAM 530048

AFFILIATED TO ANDHRA UNIVERSITY, VISAKHAPATNAM

Academic Rules & Regulations For B.Tech. Programmes Including Honors and Minors

Regulation Number: R-24
Effective Date: 26.10.2024
Subject: Award of B.Tech degree with Minor in Academic Rules & Regulations R-24
Responsible Division/Department: Academic Council
Check what type of Regulation this is:

☐New Regulation

☐Major Revision of Existing Regulation

☒Minor/Technical Revision of Existing Regulation

☐Reaffirmation of Existing Regulation

☐Repeal of Existing Regulation

OBJECTIVE & PURPOSE

This amendment pertains to the Regulations for the B.Tech Program at GVPCEW(A), effective for the 2024-25 admitted batch. In Section 17 (A-ii) of the Academic Rules & Regulations (R-24), one of the conditions for receiving the B.Tech Degree with Minor was to earn 12 credits within the 160 credits required for the B.Tech degree. This condition has now been revised to require earning 12 additional credits beyond the 160 credits.

STATEMENT FROM RULES & REGULATIONS (R-24)

Existing Clause	Changed/New Clause
17. Award of Degree: **A. Eligibility for the award of Degree/ Degree with Minor:** A student shall be eligible for the award of the B.Tech. Degree/ B.Tech. Degree with Minor if she fulfills the following conditions: i) Register and successfully complete all the courses prescribed within the stipulated period. ii) Earn 160 credits for B.Tech. degree/ earn 12 credits within 160 credits for B.Tech. with Minor degree and pass in all non-credit mandatory courses. iii) Secure satisfactory grade in social activity. iv) No disciplinary action is pending against her. v) Pays the prescribed fee for all the years.	**17. Award of Degree:** **A. Eligibility for the award of Degree/ Degree with Minor:** A student shall be eligible for the award of the B.Tech. Degree/ B.Tech. Degree with Minor if she fulfills the following conditions: i) Register and successfully complete all the courses prescribed within the stipulated period. ii) Earn 160 credits for B.Tech. degree **and an additional 12 credits beyond these 160 credits for the B.Tech. with Minor degree**, and pass all non-credit mandatory courses. iii) Secure satisfactory grade in social activity. iv) No disciplinary action is pending against her. v) Pays the prescribed fee for all the years.

Approved as amended by the Academic Council Meeting (26.10.2024)

Chairman of the Meeting
Academic Council

Annexure-2

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous)

(Approved by AICTE, New Delhi and Permanently Affiliated to Andhra University, Visakhapatnam)

Madhurawada :: Visakhapatnam – 530 048

COURSE STRUCTURE

(Applicable for the Academic Year 2024-25 onwards)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.Tech. Computer Science and Engineering

SCHEME AND SYLLABI

(With effect from 2024-25 admitted batch)

I Year - I Semester

Course Code	Category	Course Title	Hours per Week		Internal Marks	External Marks	Total Marks	Credits
			L	P				
24BM11RC01	BS	Calculus and Differential Equations	3	0	30	70	100	3
24BC11RC01	BS	Green Chemistry	3	0	30	70	100	3
24HE11RC01	HSS	English	3	0	30	70	100	3
24CT11RC01	ES	Fundamentals of Computers	3	0	30	70	100	3
24CT11RC02	ES	Problem Solving using C	3	0	30	70	100	3
24HE11RC02	HSS	Communication Skills Lab	0	3	50	50	100	1.5
24CT11RC03	ES	Computer Engineering Workshop	0	3	50	50	100	1.5
24CT11RC04	ES	Problem Solving using C Lab	0	3	50	50	100	1.5
							Total Credits	**19.5**

I Year - II Semester

Course Code	Category	Course Title	Hours per Week		Internal Marks	External Marks	Total Marks	Credits
			L	P				
24BM11RC02	BS	Linear Algebra and Vector Calculus	3	0	30	70	100	3
24BP11RC01	BS	Engineering Physics	3	0	30	70	100	3
24EC11RC05	ES	Digital Logic Design	3	0	30	70	100	3
24EC11RC04	ES	Elements of Electronics Engineering	3	0	30	70	100	3
24CT11RC06	ES	Python Programming	3	0	30	70	100	3
24BP11RC02	BS	Engineering Physics Lab	0	3	50	50	100	1.5
24CT11RC07	ES	Python Programming Lab	0	3	50	50	100	1.5
24CT11RC08	ES	Web Technologies Fundamentals Lab	0	3	50	50	100	1.5
							Total Credits	**19.5**

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous)

(Approved by AICTE, New Delhi and Permanently Affiliated to Andhra University, Visakhapatnam)

Madhurawada :: Visakhapatnam – 530 048

COURSE STRUCTURE

(Applicable for the Academic Year 2024-25 onwards)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING [ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING]

B.TECH. COMPUTER SCIENCE AND ENGINEERING - AIML

SCHEME AND SYLLABI

(With effect from 2024-25 admitted batch)

I Year - I Semester

Course Code	Category	Course Title	Hours per Week		Internal Marks	External Marks	Total Marks	Credits
			L	P				
24BM11RC01	BS	Calculus and Differential Equations	3	0	30	70	100	3
24BP11RC01	BS	Engineering Physics	3	0	30	70	100	3
24EC11RC04	ES	Elements of Electronics Engineering	3	0	30	70	100	3
24CT11RC01	ES	Fundamentals of Computers	3	0	30	70	100	3
24CT11RC02	ES	Problem Solving using C	3	0	30	70	100	3
24BP11RC02	BS	Engineering Physics Lab	0	3	50	50	100	1.5
24CT11RC03	ES	Computer Engineering Workshop	0	3	50	50	100	1.5
24CT11RC04	ES	Problem Solving using C Lab	0	3	50	50	100	1.5
							Total Credits	**19.5**

I Year - II Semester

Course Code	Category	Course Title	Hours per Week		Internal Marks	External Marks	Total Marks	Credits
			L	P				
24BM11RC02	BS	Linear Algebra and Vector Calculus	3	0	30	70	100	3
24BC11RC01	BS	Green Chemistry	3	0	30	70	100	3
24HE11RC01	HSS	English	3	0	30	70	100	3
24EC11RC05	ES	Digital Logic Design	3	0	30	70	100	3
24CT11RC06	ES	Python Programming	3	0	30	70	100	3
24HE11RC02	HSS	Communication Skills Lab	0	3	50	50	100	1.5
24CT11RC07	ES	Python Programming Lab	0	3	50	50	100	1.5
24CT11RC08	ES	Web Technologies Fundamentals Lab	0	3	50	50	100	1.5
							Total Credits	**19.5**

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous)

(Approved by AICTE, New Delhi and Permanently Affiliated to Andhra University, Visakhapatnam)

Madhurawada :: Visakhapatnam – 530 048

COURSE STRUCTURE

(Applicable for the Academic Year 2024-25 onwards)

DEPARTMENT OF INFORMATION TECHNOLOGY

B.Tech. Information Technology

SCHEME AND SYLLABI

(With effect from 2024-25 admitted batch)

I Year - I Semester

Course Code	Category	Course Title	Hours per Week		Internal Marks	External Marks	Total Marks	Credits
			L	P				
24BM11RC01	BS	Calculus and Differential Equations	3	0	30	70	100	3
24BC11RC01	BS	Green Chemistry	3	0	30	70	100	3
24HE11RC01	HSS	English	3	0	30	70	100	3
24CT11RC01	ES	Fundamentals of Computers	3	0	30	70	100	3
24CT11RC02	ES	Problem Solving using C	3	0	30	70	100	3
24HE11RC02	HSS	Communication Skills Lab	0	3	50	50	100	1.5
24CT11RC03	ES	Computer Engineering Workshop	0	3	50	50	100	1.5
24CT11RC04	ES	Problem Solving using C Lab	0	3	50	50	100	1.5
							Total Credits	**19.5**

I Year - II Semester

Course Code	Category	Course Title	Hours per Week		Internal Marks	External Marks	Total Marks	Credits
			L	P				
24BM11RC02	BS	Linear Algebra and Vector Calculus	3	0	30	70	100	3
24BP11RC01	BS	Engineering Physics	3	0	30	70	100	3
24EC11RC05	ES	Digital Logic Design	3	0	30	70	100	3
24EC11RC04	ES	Elements of Electronics Engineering	3	0	30	70	100	3
24CT11RC06	ES	Python Programming	3	0	30	70	100	3
24BP11RC02	BS	Engineering Physics Lab	0	3	50	50	100	1.5
24CT11RC07	ES	Python Programming Lab	0	3	50	50	100	1.5
24CT11RC08	ES	Web Technologies Fundamentals Lab	0	3	50	50	100	1.5
							Total Credits	**19.5**

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN

(Autonomous)

(Approved by AICTE, New Delhi and Permanently Affiliated to Andhra University, Visakhapatnam)

Madhurawada :: Visakhapatnam – 530 048

COURSE STRUCTURE

(Applicable for the Academic Year 2024-25 onwards)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

B.Tech. Electronics and Communication Engineering

SCHEME AND SYLLABI

(With effect from 2024-25 admitted batch)

I Year - I Semester

Course Code	Category	Course Title	Hours per Week		Internal Marks	External Marks	Total Marks	Credits
			L	P				
24BM11RC01	BS	Calculus and Differential Equations	3	0	30	70	100	3
24BP11RC01	BS	Engineering Physics	3	0	30	70	100	3
24EE11RC02	ES	Network Theory and Machines	3	0	30	70	100	3
24CT11RC02	ES	Problem Solving using C	3	0	30	70	100	3
24EC11RC01	ES	Electronic Devices and Circuits	3	0	30	70	100	3
24BP11RC02	BS	Engineering Physics Lab	0	3	50	50	100	1.5
24CT11RC04	ES	Problem Solving using C Lab	0	3	50	50	100	1.5
24EC11RC02	ES	Electronic Devices and Circuits Lab	0	3	50	50	100	1.5
							Total Credits	**19.5**

I Year - II Semester

Course Code	Category	Course Title	Hours per Week		Internal Marks	External Marks	Total Marks	Credits
			L	P				
24BM11RC02	BS	Linear Algebra and Vector Calculus	3	0	30	70	100	3
24BC11RC01	BS	Green Chemistry	3	0	30	70	100	3
24HE11RC01	HSS	English	3	0	30	70	100	3
24EC11RC05	ES	Digital Logic Design	3	0	30	70	100	3
24EC11RC06	ES	Electronic Circuit Analysis	3	0	30	70	100	3
24HE11RC02	HSS	Communication Skills Lab	0	3	50	50	100	1.5
24EC11RC07	ES	Digital Logic Design Lab	0	3	50	50	100	1.5
24EC11RC08	ES	Electronic Circuit Analysis Lab	0	3	50	50	100	1.5
							Total Credits	**19.5**

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN

(Autonomous)

(Approved by AICTE, New Delhi and Permanently Affiliated to Andhra University, Visakhapatnam)

Madhurawada :: Visakhapatnam – 530 048

COURSE STRUCTURE

(Applicable for the Academic Year 2024-25 onwards)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

B.Tech Electrical and Electronics Engineering

SCHEME AND SYLLABI

(With effect from 2024-25 admitted batch)

I Year - I Semester

Course Code	Category	Course Title	Hours per Week		Internal Marks	External Marks	Total Marks	Credits
			L	P				
24BM11RC01	BS	Calculus and Differential Equations	3	0	30	70	100	3
24BP11RC01	BS	Engineering Physics	3	0	30	70	100	3
24BC11RC01	BS	Green Chemistry	3	0	30	70	100	3
24EC11RC03	ES	Basic Electronics Engineering	3	0	30	70	100	3
24EE11RC01	ES	Fundamentals of Electrical Engineering	3	0	30	70	100	3
24BP11RC02	BS	Engineering Physics Lab	0	3	50	50	100	1.5
24BC11RC02	BS	Green Chemistry Lab	0	3	50	50	100	1.5
24CT11RC05	ES	IT Essentials Lab	0	3	50	50	100	1.5
							Total Credits	**19.5**

I Year - II Semester

Course Code	Category	Course Title	Hours per Week		Internal Marks	External Marks	Total Marks	Credits
			L	P				
24BM11RC02	BS	Linear Algebra and Vector Calculus	3	0	30	70	100	3
24HE11RC01	HSS	English	3	0	30	70	100	3
24CT11RC02	ES	Problem Solving Using C	3	0	30	70	100	3
24EE11RC03	ES	Electrical Circuits – 1	3	0	30	70	100	3
24EE11RC04	ES	Thermal & Hydro Prime Movers	3	0	30	70	100	3
24HE11RC02	HSS	Communication Skills Lab	0	3	50	50	100	1.5
24CT11RC04	ES	Problem Solving Using C Lab	0	3	50	50	100	1.5
24EE11RC05	ES	Electrical Engineering Workshop	0	3	50	50	100	1.5
							Total Credits	**19.5**

Annexure-3

GVP COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

M. Tech -Computer Science and Engineering (Data Science)

Course Structure w.e.f. 2024-25

I SEMESTER

Code	Name of the subject	Periods/week		Max.Marks		Total	Credits
		Theory	Lab	Ext.	Int.		
24CS21RC01	Introduction to Data Science	3	-	70	30	100	3
24CS21RC02	Cloud Computing and Virtualization	3	-	70	30	100	3
24CS21PE01	Elective-I	3	-	70	30	100	3
24CS21PE02	Elective-II	3	-	70	30	100	3
24HM21RC01	Research Methodology &IPR	2	-	70	30	100	2
24HM21AC02	Organizational Behavior (Audit Course)	3	-	70	30	100	0
24CS21RC03	Data Science Applications with Python Lab		3	50	50	100	1.5
24CS21RC04	Cloud Computing and Big Data Analytics Lab		3	50	50	100	1.5
	Total	**18**	**6**	**520**	**280**	**800**	**17**

Elective-I: Big Data Analytics, Computational Linear Algebra, Soft Computing, Computational Biology, Internet of Things

Elective II: Cyber Security for Data Science, Optimization Techniques for Data Science, Time Series data Analysis, Natural Language Processing, Statistical Modeling

II SEMESTER

Code	Name of the subject	Periods/week		Max. Marks		Total	Credits
		Theory	Lab	Ext.	Int.		
24CS21RC05	Machine Learning	3	-	70	30	100	3
24CS21RC06	Data Visualization	3	-	70	30	100	3
24CS21PE03	Elective-III	3	-	70	30	100	3
24CS21PE04	Elective-IV	3	-	70	30	100	3
24HM21AC03	Entrepreneurship (Audit Course)	3	-	70	30	100	0
24CS21RC07	Machine Learning Lab	-	3	50	50	100	1.5
24CS21RC08	Data visualization using Tableau Lab	-	3	50	50	100	1.5
24CS21PR01	Mini Project with Seminar	-	4	-	100	100	2
	Total	**15**	**9**	**450**	**350**	**800**	**17**

Elective III: Image and Video Analytics, Social Media Analytics, Deep Learning, Business Analytics, High Performance Computing

Elective IV: Geographic Information System, Block Chain Technology, Secure Software Design, Data Storage Technologies and Networks, Information Retrieval Systems

GVP COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

M.Tech -VLSI DESIGN & EMBEDDED SYSTEMS
Course Structure and Scheme of Valuation w.e.f. 2024-25 admitted batch

I SEMESTER

Code	Name of the subject	Periods/week		Max. Marks		Total	Credits
		Theory	Lab	Ext.	Int.		
24EC21RC01	Analog and Digital CMOS VLSI Design	3	-	70	30	100	3
24EC21RC02	Embedded Systems Design	3	-	70	30	100	3
24EC21PE01	Elective-I	3	-	70	30	100	3
24EC21PE02	Elective-II	3	-	70	30	100	3
24HM21AC01	Research Methodology &IPR	2	-	70	30	100	2
24HM21AC02	Organizational Behavior (Audit Course)	3	-	-	100	100	0
24EC21RC03	Analog and Digital CMOS VLSI Design Lab	-	3	50	50	100	1.5
24EC21RC04	Embedded system Design Lab	-	3	50	50	100	1.5
	Total	**17**	**6**	**450**	**350**	**800**	**17**

Elective-I: Application Specific Integrated Circuit (ASIC)/ Advanced Operating Systems/ Parallel Processing

Elective II: CPLD and FPGA Architectures & Applications / Electronic Design Automation Tools/ Digital System Design

II SEMESTER

Code	Name of the subject	Periods/week		Max. Marks		Total	Credits
		Theory	Lab	Ext.	Int.		
24EC21RC05	RTL Design & Verification using System Verilog	3	-	70	30	100	3
24EC21RC06	Internet of Things and its Applications	3	-	70	30	100	3
24EC21PE03	Elective-III	3	-	70	30	100	3
24EC21PE04	Elective-IV	3	-	70	30	100	3
24HM21AC03	Entrepreneurship (Audit course)	3	-	-	100	100	0
24EC21RC07	RTL Design & Verification using System Verilog Lab	-	3	50	50	100	1.5
24EC21RC08	Internet of Things and its Applications Lab	-	3	50	50	100	1.5
24EC21PR01	Mini Project with Seminar	-	4	-	100	100	2
	Total	**15**	**10**	**380**	**420**	**800**	**17**

Elective III: Low Power VLSI Design/ System on Chip Design/ Digital Signal and Image Processing

Elective IV: Communication Buses and Interfaces / Design for Testability/ DSP Processors and Architectures

Annexure-4

Annexure-I

Python Programming
I Year B. Tech. II semester
(Common to CSE, CSE (AI&ML), IT Branches)

Course Code:	L	T	P	C
	4	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to:	
C01:	**Understand** the historical development, necessity, applications, and basic concepts of python programming
C02:	**Identify** and implement appropriate control structures to solve a particular programming problem
C03:	**Examine** various data structures and apply to solve real world problems.
C04:	**Build** simple functions and packages used in python for solving real world problems.
C05:	**Outline** Object Oriented concepts in python and illustrate Exception handling

UNIT-I — **8 Lectures**

Introduction: History of Python, Need of Python Programming, Applications of Python, Variables, Assignment, Comments, Keywords, Data types, Input-Output, Indentation.

TextBook-1: Chapter 3 (S-3.1 – S-3.12)

Learning Outcomes:

At the end of the unit, the student will be able to

1. Understand the Evolution of Python [L2]
2. Recall the Need and Applications of Python [L1]
3. Outline python's Input and Output Functions[L2]

UNIT-II — **10 Lectures**

Operators and Expressions: Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations

Control Flow- if, if-elif-else, for, while, break, continue, pass

TextBook-1: Chapter 3 (S-3.12), Chapter 4 (S-4.1 – S-4.7)

Learning Outcomes:

At the end of the unit, the student will be able to

1. Illustrate python operators: arithmetic, comparison, assignment, logical, bitwise, membership, identity [L2]
2. Make use of control flow statements: if, if-elif-else, for, while, break, continue, pass. [L3]

UNIT-III — **12 Lectures**

Data Structures: Strings, Lists, Tuples, Sets, Dictionaries. Data Structures manipulations - create, Index, Negative indexing, Slicing, update, add elements, delete or remove elements, operations, Comprehension, Membership Test, Iteration.

TextBook-1: Chapter 6 (S-6.1 – S-6.9), Chapter 8 (S-8.1 – S-8.6)

Learning Outcomes:

At the end of the unit, the student will be able to

1. Understanding basic operations on lists, including indexing and slicing [L2]
2. Utilize methods of lists, tuples, sets, and dictionaries to solve problems [L3]
3. Compare and apply appropriate use cases for lists, tuples, sets, and dictionaries. [L2]

UNIT-IV — **10 Lectures**

Functions - Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Lambda Functions, Function Returning Values, Built-in functions, Scope of the Variables in a Function - Global and Local Variables.

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Modules: Creating modules, import statement, from…import statement, namespaces. **Python packages:** Introduction to PIP, Installing Packages via PIP
TextBook-1: Chapter 5 (S-5.1 – S-5.8,5.12)
Learning Outcomes:
At the end of the unit, the student will be able to
1. Understanding and implementing various types of function arguments and scopes in Python. [L2] 2. Utilize Python modules to understanding the import mechanisms [L3]

UNIT-V **11 Lectures**
Object Oriented Programming (OOP) in Python: Classes and Objects, Class Method and self Argument, The __init__() Method (The Class Constructor), Class Variables and Object Variables, Public and Private Data Members, Inheritance, Overriding Methods. **Error and Exceptions:** Introduction to Errors and Exceptions, Handling Exception, try except block, finally block, Raising Exceptions. **File Handling**: Type of files, Opening and Closing files, Reading and Writing files.
TextBook-1: Chapter 9 (S-9.1 – S-9.8), Chapter 10 (S-10.1 – S-10.3) TextBook-1: Chapter 7 (S-7.1 – S-7.5), Chapter 12 (S-12.1 – S-12.10)
Learning Outcomes:
At the end of the unit, the student will be able to
1. Understand and implement classes, methods, and the 'self' variable in Python [L2] 2. Demonstrate concepts of inheritance, method overriding, and data hiding in OOP [L2] 3. List the differences between errors and exceptions, and handle exceptions using try-except blocks [L1] 4. Illustrate file operations including reading, writing, and manipulating file pointers in Python. [L2]

Text Books:
1. Reema Thareja, "Python Programming: Using Problems Solving Approach", Oxford University Press, 2017 2. Fundamentals of Python First Programs, Kenneth. A. Lambert, Cengage.
Reference Books:
1. Fundamentals of Data Structures using Python, P Lalitha Surya Kumari, P. S. Avadhani, Lambert Academic Publishing 2. Introduction to Python Programming, Gowrishankar.S, Veena A, CRC Press. 3. Introduction to Programming Using Python, Y. Daniel Liang, Pearson.
Web References:
1. https://www.tutorialspoint.com/python3/python_tutorial.pdf 2. https://www.python.org/doc/

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Annexure-II

Fundamentals of Computers
I Year B. Tech. I semester
(Common to CSE, CSE (AI&ML), IT Branches)

Course Code:	L	T	P	C
	4	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to:	
C01:	Identify different I/O devices and their usage.
C02:	Compare different computer memory with their efficiency.
C03:	Relate different computer software's and programming languages for solving problems.
C04:	Summarize the use of operating system, database system, and computer network in the field of computing in engineering.
C05:	Infer the methods and applications of artificial intelligence (AI), machine learning (ML) and data science.

UNIT-I — **10 Lectures**

Introduction to computers: Computers, Stored Program Concept, Classification of Computers, Evolution and Development of Computers, Application Areas of Computers, Features/Characteristics of Computers, Basic Organization of a Computer.

Input and Output Devices: Input Devices, Output Devices, Soft Copy Devices, Hard Copy Devices, Voice Response Systems, Biometric Devices

TextBook-1: Chapter 1 (S-1.1 – S-1.7)
https://oer-studentresources.gesci.org/wp-content/courses/Computer/CS-F1-Introduction-to-computers/evolution_and_development_of_computers.html (Development of Computers)
TextBook-1: Chapter 2 (S-2.1 – S-2.6)

Learning Outcomes:

At the end of the unit, the student will be able to

1. Outline characteristics and classification of computers (L2)
2. Demonstrate different configurations of software and hardware used in computer (L2)
3. Model the computer by organizing different computer peripherals such as I/O, CPU, etc. (L3)

UNIT-II — **10 Lectures**

Computer Memory: Introduction, Memory Organization, Memory Hierarchy, Sequential and Random Access, Processor Registers, Cache Memory, Primary Memory,Secondary Storage Devices, Magnetic Tapes, Floppy Disks, Hard Disks, External Hard Disks, Optical Disks, USB Flash Drives, Memory Cards, Mass Storage Devices.

TextBook-1: Chapter 3 (S-3.1 – S-3.16)

Learning Outcomes:

At the end of the unit, the student will be able to

1. Summarize computer memory hierarchy. (L2)
2. Classify different memory w.r.t. speed and cost. (L2)
3. Illustrate different external storage devices and its applications. (L2)

UNIT-III — **10 Lectures**

Computer Software: Introduction to Computer Software, Classification of Computer Software, System Software, Application software, Graphics Software, Multimedia Software, Database Management Software, Firmware, Middleware, Procuring Computer Software.

Problem Solving Using Computers: Introduction, Program Development Life Cycle, Program Design Tools, Programming Languages, Generations of Programming Languages, Categorization of High-level Languages, Some Popular High-level Languages, Apps.

TextBook-1: Chapter 6 (S-6.1 – S-6.7)
TextBook-1: Chapter 7 (S-7.1 – S-7.7)
https://www.builder.ai/glossary/app#:~:text=An%20app%20is%20a%20type,enhance%20productivity%20and%20streamline%20communication (Apps)

Learning Outcomes:

At the end of the unit, the student will be able to

1. Compare different computer software's (L2)
2. Summarize different programming languages for solving problems. (L2)
3. Contrast Structured Programming Language, Logic-oriented Programming Language, and

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Object-oriented Programming. (L2)

UNIT-IV **12 Lectures**

Fundamental Operating Systems: Introduction, History of Operating Systems, Functions of Operating Systems, Types of Operating Systems, Providing User Interface, Popular Operating Systems

Database Systems: File-Oriented Approach, Database-oriented Approach, Database Views, Three-schema Architecture, Database Models, Components of Database Management, Retrieving Data Through Queries.

Computer Networks: Introduction to Computer Networks, Types of Networks, Physical Components of a Network, Wired Media, Wireless Media, Networking Devices, Network Topologies, Wireless Networks.

TextBook-2: Chapter 11 (S-11.1 / P-238 – S-11.11 / P-258)
TextBook-1: Chapter 9 (S-9.1 – S-9.7), Chapter 10 (S-10.1 – S-10.8)

Learning Outcomes:

At the end of the unit, the student will be able to

1. Explain fundamentals of operating systems. (L2)
2. Illustrate database system applications and its design concepts. (L2)
3. Outline fundamentals of computer networks and its applications. (L2)

UNIT-V **8 Lectures**

Introduction to Artificial Intelligence & Machine Learning (AI&ML) and Data Science: Introduction to AI & ML, and Data Science, Use Cases in Business and Scope, Modelling Concepts, CRISP-DM Method

1. https://community.aws/content/2drbbXokwrIXivItJ8ZeCk3gT5F/introduction-to-artificial-intelligence-and-machine-learning?lang=en **(Artificial Intelligence)**
2. https://www.javatpoint.com/machine-learning-models **(Machine Learning)**
3. https://www.techtarget.com/searchenterpriseai/feature/Top-12-machine-learning-use-cases-and-business-applications **(Machine Learning)**
4. https://www.heavy.ai/learn/data-science **(Data Science)**
5. https://www.sv-europe.com/crisp-dm-methodology/ **(CRISP-DM Method)**

Learning Outcomes:

At the end of the unit, the student will be able to

1. Outline the main methods and applications of artificial intelligence (AI) concepts. (L2)
2. Outline the main methods and applications of machine learning (ML) concepts. (L2)
3. Outline the main methods and applications of data science concepts. (L2)

Text Books:

1. Reema Thareja, Fundamentals of Computers, Second Edition, Oxford University Press, 2019.
2. E Balagurusamy, Fundamentals of Computers, Tata McGraw Hill Education Private Limited, 2009

Reference Books:

1. Raghu Ramakrishnan, Johannes Gehrke, Database Management Systems, 4th Edition, McGraw-Hill, 2002.
2. Andrew S. Tanenbaum, Modern Operating Systems, 2nd edition, PHI, 1995.

Web References:

1. https://oer-studentresources.gesci.org/wp-content/courses/Computer/CS-F1-Introduction-to-computers/evolution_and_development_of_computers.html (Development of Computers)
2. https://www.builder.ai/glossary/app#:~:text=An%20app%20is%20a%20type,enhance%20productivity%20and%20streamline%20communication (Apps)
3. https://www.geeksforgeeks.org/what-is-an-operating-system/ (Operating System)
4. https://www.javatpoint.com/computer-network-tutorial (Computer Network)
5. https://community.aws/content/2drbbXokwrIXivItJ8ZeCk3gT5F/introduction-to-artificial-intelligence-and-machine-learning?lang=en **(Artificial Intelligence)**
6. https://www.javatpoint.com/machine-learning-models **(Machine Learning)**
7. https://www.techtarget.com/searchenterpriseai/feature/Top-12-machine-learning-use-cases-and-business-applications **(Machine Learning)**
8. https://www.heavy.ai/learn/data-science **(Data Science)**
9. https://www.sv-europe.com/crisp-dm-methodology/ **(CRISP-DM Method)**

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Annexure-III

Python Programming Lab
I Year B. Tech. II semester
(Common to CSE, CSE (AI&ML), IT Branches)

Course Code:	L	T	P	C
	0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to:		Module No.
C01:	Understand core programming basics and various Operators of Python	1,2
C02:	Implement programs using conditional statements and loops and strings.	3,4
C03:	Develop functions and strings to perform simple tasks.	5,6
C04:	Make use of various data structures like lists, tuples, sets and dictionaries.	7,8,9
C05:	Implement Python programs with files, Classes and objects	10,11

Module-1: Basics of Python

a) Write a program to display the statements.
b) Demonstrate about fundamental Data types in Python Programming. (i.e., int, float, complex, bool and string types)
c) Write a Python program to demonstrate various type conversion functions.
d) Write a program to demonstrate the inbuilt Math function

Module-2: Operators in Python

a) Demonstrate the following Operators in Python with suitable examples.
i) Arithmetic Operators ii) Relational Operators iii) Assignment Operators iv) Logical Operators v) Bit wise Operators vi) Ternary Operator vii) Membership Operators viii) Identity Operators

Module-3: Conditional Branching Statements

a) Write a program to check whether the given number is even or odd
b) Write a program to read marks of a student and display the corresponding grade
c) Write a program to find the largest element among the given numbers (multi-way if-elif-else statements.)

Module-4: Looping/Iterative Statements

a) Implement the following programs using while loop and for loop
i. Display all prime numbers up to n.
ii. Print the nth multiplication table.
iii. Print different patterns using loops:
b) Demonstrate the following control transfer statements in Python with suitable examples.
i. break ii. continue iii. Pass

Module-5: Functions

a) Write a function to find the multiplication of two numbers and demonstrate the usage of parameters and arguments of a function.
b) Write a program to define a function using default arguments.
c) Demonstrate lambda functions in Python with suitable example programs.

Module-6: Strings

a) Write a program to manage and analyse customer feedback using string operations include:
i. Create feedback with name, email, comment
ii. Collecting feedback.
iii. Normalizing feedback (e.g., removing extra spaces, converting to lowercase).
iv. Extracting key in formation (e.g., names, email addresses, and comments).

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v. Searching for keywords.
vi. Replacing certain words.
vii. Formatting feedback for display.
viii. Summarizing feedback.

Module-7: Lists:

a) Write a program to create a list and perform the following operations:
   i. + ii. * iii. slicing iv. del
b) Inventory Management: You have a list of items in your warehouse along with their quantities. Write a program to find out which items are low in stock (quantity less than 10). (use only comprehensions)
c) Employee Performance: You have a list of employee names and their corresponding performance scores. Write a program to sort the list based on the performance scores in descending order.
d) Sales Analysis: you have a list of sales figures for the past week. Write a program to find the total sales, the highest sale, the lowest sale, and the average sale.
e) Write a program to calculate the length of each element in a list using map function in python.

Module-8: Tuples

a) Write a program to return the top n's most frequently occurring chars and their respective counts. e.g. string=aaaaaabbbbcccc, n=2 should return [(a 6) (b 4)].
b) Write a program to create n iterables of varied sizes and group the values using zip function in python.
c) Student Information: Write a program to create a list of tuples where each tuple contains the student ID, name, and grade and find the student with the highest grade.
d) Course Enrolment: Write a program to create list of tuples where each tuple contains the course ID and the number of students enrolled and find the total number of students enrolled across all courses
e) Faculty Information: Write a program to create a list of tuples where each tuple contains the faculty ID, name, and department and find all faculty members in a given department.
f) Library Book Tracking: You have a list of tuples where each tuple contains the book ID, title, and number of copies available. Write a program to find all books with fewer than 5 copies available.

Module-9: Sets & Dictionaries

a) Write a program to create two sets and perform the following operations:
   i. Union ii. Intersection iii. Difference iv. Asymmetric Difference
b) Write a program to generate a dictionary that contains numbers (between 1 and n) in the form of (x,x*x).
c) Write a program to implement a shopping cart where you can add items with their prices and quantities, and then calculate the total cost.
d) Banking System: Write a program to create dictionary with customer name and balance and Retrieve the balance for a given customer, Deposit a specified amount into a customer's account, Withdraw a specified amount from a customer's account if sufficient balance is available, Transfer a specified amount from one customer's account to another's and Remove a customer from the bank's system.

Module-10: Classes and objects

a) Create a class to represent menu items in a restaurant with attributes like name, price, and category. Implement methods to display menu details and calculate the total cost of a selected list of items.

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b) Write a program to read 3 subject marks and display pass or failed using class and object.

Module-11: Files

a) Write a program to copy the contents of a file to another file.

b) Write a program to compute the number of characters, words and lines in a file.

Case Study:

Select any one application mentioned below

Note: A report has to be submitted by every student at the end of the semester that includes design, coding, output, etc.

1. Design a Python program to manage inventory, process orders, and handle customer information for an online store.
2. Create a library system to track books, manage member accounts, and handle book loans and returns.
3. Implement a personal finance management tool to track income, expenses, and generate monthly reports.
4. Create a system to manage student grades, calculate GPAs, and generate academic reports.
5. Develop a Python-based movie recommendation system using collaborative filtering.
6. Build a to-do list application that allows users to add, update, delete, and prioritize tasks..
7. Build a patient management system to handle appointments, medical records, and billing.
8. Design a digital menu for a restaurant with options for ordering, bill generation, and inventory management.
9. Implement a fitness tracking application to log workouts, track progress, and suggest exercise plans.
10. Build a secure online voting platform with user authentication and vote tallying.
11. Create a program to manage recipes, including ingredients, instructions, and nutritional information.
12. Build a travel planning application to manage itineraries, bookings, and budget tracking.
13. Develop an e-learning application with course creation, student enrolment, and progress tracking.
14. Build a car rental management system to handle bookings, returns, and vehicle maintenance.
15. Build a budget planning application to track expenses, income, and financial goals.
16. Develop a cryptocurrency tracking application to monitor prices, market trends, and portfolio performance.

Reference Books:

1. Python Programming: Using Problem Solving Approach by Reema Theraja , Oxford publications
2. Ashok N Kamthane, Amit Ashok Kamthane, *Programming and Problem Solving with Python*, 1st Edition, McGraw Hill Education (India), 2018.

Web References:

1. https://www.python.org/doc/
2. https://www.w3schools.com/python/python_reference.asp
3. https://thepythonguru.com/
4. https://www.programiz.com/python-programming

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Annexure-IV

Computer Engineering Workshop
I Year B. Tech. I semester
(Common to CSE, CSE (AI&ML), IT Branches)

Course Code:	L	T	P	C
	0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to:		Module No.
C01:	Identify the peripherals of a computer.	1
C02:	Demonstrate the installation process of operating systems like MS Windows, LINUX.	2
C03:	Make use of MS-Office suite that comprises of various applications to create documents, organizes & analyses data and captivating presentations.	3
C04:	Categorize various UNIX/LINUX Commands to work on a modern operating system	4
C05:	Experiment with GIT Commands and make use of LaTeX to prepare research articles.	5

Module-1: Hardware Concepts

1. Identify the peripherals of a computer, components in a CPU and its functions.
2. Draw the block diagram of the CPU along with the configuration of each peripheral.
3. Disassemble and assemble the PC back to working condition.

Module-2: Software Installations

1. Install operating systems like LINUX and MS windows on a personal computer.
2. The system should be configured as dual boot with both MS windows and LINUX.

Module-3: Office Suite

1. Creating Documents: Formatting Fonts/Texts, page layout, Applying Text effects, Character Spacing, Borders and Colours, Inserting Header and Footer, equation editor.
2. Spreadsheet Orientation: Accessing, overview of toolbars, saving spreadsheet files, Using help and resources. Creating a Scheduler, Gridlines, Format Cells, Summation, auto fill, Formatting Text, Renaming and Inserting worksheets, Hyper linking.
3. Excel Calculation: Calculating Average, Cell Referencing, Excel Formula, std. deviation, Charts, Count Function, Sorting, Conditional formatting, Excel Advanced-sumif, VLOOKUP, and Pivot Table.
4. Creating Power Point: Student should work on basic power point utilities and tools to create basic power point presentation. PPT Orientation, Slide Layouts, Inserting Text, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting Images, Tables and charts.
5. Software as a service (SaaS): Usage of online office suite.

Module-4: UNIX/LINUX Commands

1. Study and practice on file system, handling files with commands, syntax, usage, application.
2. Practice on vi editor.
3. Study and practice on shells/shell programming with relevant programming constructs, syntax, usage, application.

Module-5: GIT Commands and LaTeX

1. Installation of GIT, Branch in Git Basic GIT Commands.
2. Installation of LaTeX and preparing research articles by creating overleaf account.
3. Introduction to Scratch Programming - Introduction, Stage, Sprite, Script, Block Palette.

Reference Books:

1. IT Essentials: PC Hardware and Software Companion Guide, Third Edition, David Anfinson, Ken Quamme.
2. UNIX concepts and applications by Sumitabha Das, TMH Publications.
3. Shell programming by Yashwanth Kanetkar.

Web References:

1. https://www.javatpoint.com/

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Annexure-V

Problem solving using C
I Year B. Tech. I semester
(Common to CSE, CSE (AI&ML), IT, ECE, and EEE (I-II) Branches)

Course Code:

L	T	P	C
4	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
C01:	Explain the basic constructs of C through the use of simple applications.
C02:	Demonstrate the utilization of arrays and strings in the development of C programs.
C03:	Utilize functions and pointers to construct various applications in C.
C04:	Apply concepts of structures and unions to build and implement C applications.
C05:	Develop applications using sequential and random-access file processing techniques.

UNIT-I	10 Lectures
Introduction to C: Basic structure of C program, Constants, Variables and data types, Operators and Expressions, Arithmetic Precedence and associativity, Type Conversions. Managing Input and Output Operations Formatted Input, Formatted Output.	
TextBook-1: Chapter 2 (S-2.1 – S-2.12)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Outline the Basic Structure and Components of C Programs. (L2) 2. Demonstrate Variables, Data Types, Operators, and Expressions. (L2) 3. Illustrate Input and Output Operations. (L2)	

UNIT-II	12 Lectures
Decision Making, Branching, Looping: Decision making with if statement, Simple if statement, The if...else statement, Nesting of if...else statement, the else... if ladder, switch statement, the (? :) operator, the goto statement, The while statement, the do statement, the for statement, Jumps in Loops. **Arrays & Strings:** One, Two-dimensional Arrays, multi-dimensional Arrays, Character Arrays. Declaration and Initialization of Strings, reading and writing of strings, string handling functions.	
TextBook-1: Chapter 3 (S-3.1 – S-3.8), TextBook-2:Chapter 13,14,15,16(PP:215-283)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Classify Decision Making and Branching (L2) 2. Interpretation of Looping Constructs (L2) 3. Summarize Arrays and Strings (L2)	

UNIT-III	10 Lectures
Function and Dynamic Memory Allocation: Functions: Designing structured programs, declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, passing arrays to functions, recursion. Introduction to Pointers, Pointer Arithmetic, Pointers for Inter-Function Communication, passing pointers to functions, call by reference, Dynamic Memory Allocation.	
TextBook-1: Chapter 4 (S-4.1 – S-4.11), Chapter 5 (S-5.1 – S-5.12)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Utilize Functions (Understand and Implement Functions, Utilize Various Function Types, Advanced Function Techniques) (L3) 2. Experiment with Pointers (Basic Pointer Operations, Pointers and Data Structures) (L3) 3. Explain Advanced Pointer Usage (Pointers in Functions, Pointers to Complex Data Types) (L2)	

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UNIT-IV	10 Lectures
Structure and Unions: Defining a structure and union, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, arrays of structures, arrays within structures, structures within structures, definition and usage of union, structures and unions using functions, size of structures and bit-fields. The Type Definition (Type def), Enumerated Types.	
TextBook-1: Chapter 6 (S-6.1 – S-6.9)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Define Structures and Build C programs using Structures. (L3) 2. Explain Complex Data Structures. (L2) 3. Explain Unions and Bit-Fields. (L2)	

UNIT-V	8 Lectures
File handling: Introduction to Files, Modes of File operations, Text and Binary Files, Defining and opening a file, closing a file, Input/ Output operations on files, Error handling during I/O operations, random access to files and Command Line Arguments, user defined header files.	
TextBook-2: Chapter 19 (PP:325-348)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Outline File Operations. (L2) 2. Summarize Error Handling and Random Access. (L2) 3. Utilize Command Line Arguments. (L3)	

Text Books:
1. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", 2nd Edition, 2015, Pearson Education India, ISBN: 978-93-3254-944-9. 2. Yashavant P. Kanetkar, "Let Us C", 16th Edition, 2019, BPB Publications, ISBN: 978-93-8728-449-4.
Reference Books:
1. N. B. Venkateswarlu, E. V. Prasad, "C and Data Structures", 1st Edition, S. Chand Publishing, 2010, ISBN: 978-93-525-3356-5. 2. Pradip Dey, Manas Ghosh, "Programming in C", 2nd Edition, 2018, Oxford University Press, ISBN: 978-01-9949-147-6. 3. Jacqueline A. Jones and Keith Harrow, "Problem Solving with C", Pearson Education. ISBN: 978-93-325-3800-9. 4. E. Balagurusamy, "Programming in ANSI C", 8th Edition, 2019, McGraw Hill Education, ISBN: 978-93-5316-513-0.
Web References (e-Resources):
1. https://nptel.ac.in/courses/106105171 2. https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/pages/lecture-notes/ 3. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013843237039374336345 17_shared/overview 4. https://cse02-iiith.vlabs.ac.in/List%20of%20experiments.html

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Annexure-VI

Web Technologies Fundamentals lab
I Year B. Tech. II semester
(Common to CSE, CSE (AI&ML), IT Branches)

Course Code:

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to		**Module No.**
C01:	**Develop** professional web pages for an application using HTML elements like lists, navigations, tables, various form elements, and embedded media, including images, audio, and video.	**1,2**
C02:	**Build** inline, internal, and external CSS to enhance the visual presentation of web pages, including layout, fonts, colors, and backgrounds.	**3,4**
C03:	**Utilize** JavaScript to develop interactive HTML web pages and validate form data.	**5,6,7**
C04:	**Apply** JavaScript functions and events to enhance user interaction and provide a dynamic user experience.	**8,9**
C05:	**Experiment with** XML files to store and display structured data and write a DTD to perform well-formed and validated XML documents.	**10**

Module-1:
Design a web page using Basic HTML Elements – Structure of HTML, Headings, Paragraph, Division and Span, List, Link, Image, Table, Form, Input, Iframe, and Media Elements.

Module-2:
Design the following static web pages required for an online book store website.

(a) HOME PAGE:
i) The static home page must contain three frames.
Top frame: Logo and the college name and links to the Home page, Login page, Registration page, Catalogue page, and Cart page (the description of these pages will be given below). Left frame: At least four links for navigation, which will display the catalogue of respective links. For e.g.: When you click the link "CSE" the catalogue for CSE Books should be displayed in the Right frame. Right frame: The pages to the links in the left frame must be loaded here. Initially, this page contains a description of the website.
ii) Add media content in a frame using audio, video, and iframe elements to the Home page of an online book store website. The page should include:
1) Audio Element: An audio player to play background music or a podcast.
2) Video Element: A video player to display a promotional video about the book store.
3) Iframe Element: An iframe to embed a Google Maps location of the book store.

(b) LOGIN PAGE

(c) CATALOGUE PAGE: The catalogue page should contain the details of all the books available on the website in a table: The details should contain the following:
i) Snapshot of Cover Page. ii)Author Name. iii)Publisher.
iv) Price. v)Add to cart button.

(d) REGISTRATION PAGE: Create a "registration form "with the following fields
i) Username: Text input field
ii) Password: Password input field
iii) Email: Email input field
iv) Phone number: Text input field
v) Birthday: Date picker
vi) Favorite Color: Color picker
vii) Gender: Select an element with options (Male, Female, Other).

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Module-3:
Develop and demonstrate the usage of inline, internal, and external style sheets using CSS.

Module-4:
Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the properties of the font of the capital (colour, bold, and font size).

Module-5:
Develop and demonstrate JavaScript with POP-UP boxes and functions for the following problems:

a) Input: Click on the Display Date button using onclick( ) function
   Output: Display the date in the textbox.
b) Input: A number n obtained using prompt
   Output: Factorial of n number using alert.
c) Input: A number n obtained using prompt
   Output: A multiplication table of numbers from 1 to 10 of n using alert.
d) Input: A number n obtained using prompt and add another number using confirm
   Output: Sum of the entire n numbers using alert.

Module-6:
Write JavaScript to validate the following fields of the Registration page.

(a) First Name (Name should contain alphabets and the length should not be less than 6 characters).
(b) Password (Password should not be less than 6 characters in length).
(c) E-mail ID (should not contain any invalid and must follow the standard pattern name@domain.com)
(d) Mobile Number (The phone number should contain 10 digits only).
(e) Last Name and Address (should not be Empty).

Module-7:
Write an HTML page including any required JavaScript that takes a number from the text field in the range of 0 to 999 and shows it in words. It should not accept four and above digits, alphabets, and special characters.

Module-8:
Create an 'Employee' class extending from a base class 'Person'. The task should include:

(a) Create a class 'Person' with attributes 'name' and 'age', and add a constructor to initialize these values.
(b) Create a class 'Employee' that extends 'Person' and includes an additional attribute 'role,' with a constructor to initialize 'name,' 'age,' and 'role.'

Module-9:
Create an array of objects representing book details in an online book store. Each object should include the book title, author, genre, and price. Render the details of the books on the page using this array, demonstrating array creation, accessing array elements, and applying array methods.

Module-10:
Write an XML file which will display the Book information which includes the following:

a) Title of the Book b)Author Name c)ISBN Name
d)Publisher Name e)Edition f)Price

Write a Document Type Definition(DTD) to validate the above XML file.

Case Study:
Select any one practical applications mentioned below.
Note: A report has to be submitted by every student at the end of the semester, including design, coding, output, etc.

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1. **Portfolio Website:** Create a personal portfolio website showcasing projects, skills, and experience using HTML, CSS, and JavaScript for interactive features.
2. **Responsive Blog:** Design a responsive blog template with multiple pages, utilizing HTML for structure, CSS for styling, and JavaScript for dynamic content.
3. **E-commerce Site:** Develop a basic e-commerce website with product listings, shopping cart functionality, and user authentication using HTML, CSS, and JavaScript.
4. **Quiz Game:** Create an interactive quiz game with multiple-choice questions, scoring, and feedback using HTML, CSS, and JavaScript for functionality.
5. **To-Do List:** Develop a to-do list application allowing users to add, edit, and delete tasks, with data persistence using JavaScript local storage.
6. **Interactive Resume:** Design a dynamic resume with sections for education, experience, and skills, including interactive elements powered by JavaScript.
7. **Photo Gallery:** Create an interactive photo gallery with image lightbox effects, using CSS for styling and JavaScript for functionality.
8. **Recipe Finder:** Build a recipe search application that fetches and displays recipes from an API, using JavaScript for dynamic content updates.
9. **Expense Tracker:** Develop an expense tracker app to log and categorize expenses, with data visualization using charts and graphs created with JavaScript.
10. **Event Countdown:** Create a countdown timer for upcoming events with HTML structure, CSS styling, and JavaScript for the timer logic.
11. **Contact Form:** Create a contact form with validation and submission handling using JavaScript, styled with CSS to match the site's theme.
12. **Memory Game:** Develop a memory matching game with cards that flip and match, using CSS for design and JavaScript for game logic.
13. **Interactive Story:** Design an interactive storytelling website where users make choices that affect the narrative, using JavaScript for decision logic.
14. **Fitness Tracker:** Build a fitness tracker to log workouts and track progress, with dynamic charts and data visualization using JavaScript.
15. **Task Manager:** Create a task manager application with features for adding, editing, and prioritizing tasks, using JavaScript for interactivity.
16. **Interactive Timelines:** Design interactive timelines to visualize historical events or project milestones, using HTML, CSS, and JavaScript.
17. **Product Landing Page:** Develop a product landing page with animations and interactive elements, using CSS for styling and JavaScript for effects.
18. **Calculator:** Build a fully functional calculator with basic arithmetic operations, using JavaScript for logic and CSS for design.
19. **Job Board:** Develop a job board where users can post and search for jobs, with dynamic content updates using JavaScript.
20. **Interactive Form:** Create a multi-step interactive form with validation and progress indicators, using JavaScript for form handling and CSS for styling.

References:

1. Internet and Web Technologies by Raj Kamal, Tata McGraw-Hill.
2. Programming the World Wide Web by Robert W. Sebesta, Pearson Education.
3. An Introduction to Web Design and Programming by Paul S Wang, Sanda S Katila, 1st Edition, Cengage Learning.

Web Links:

1. https://onlinecourses.swayam2.ac.in/nou24_cs18/preview
2. https://infyspringboard.onwingspan.com/en/app/toc/lex_17739732834840810000_shared/overview (HTML5)
3. https://infyspringboard.onwingspan.com/en/app/toc/lex_18109698366332810000_shared/overview (Javascript)

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Annexure-VII

Problem Solving using C Lab
I Year B. Tech. I semester
(Common to CSE, CSE (AI&ML), IT, ECE, and EEE (I-II) Branches)

Course Code:

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to:		**Module No.**
C01:	Outline the use of basic constructs of C for simple applications.	**1,2,3**
C02:	Develop C programs for simple applications using Arrays and Strings.	**4**
C03:	Illustrate concepts such as functions, recursion, and pointers with suitable examples.	**5,6,7**
C04:	Build C programs involving Structures and Unions.	**8**
C05:	Develop applications using sequential and random-access file processing.	**9**

Module-1: I/O and Data Types
1. Write a C program to demonstrate Format Specifiers and Input/Output Statements.
2. Write a C program to demonstrate various Data Types.

Module-2: Operators and Expressions
1. Write a C program to demonstrate various Operators including Bitwise Operator.
2. Write a C program to demonstrate Arithmetic Expressions and Type Casting.

Module-3: Control Statements
1. Write a C program to demonstrate decision making statements.
2. Write a C program to demonstrate iterative statements.
3. Write a C program to demonstrate break and continue Statement.

Module-4: Arrays
1. Write a C program to demonstrate arrays (one-dimensional and two-dimensional).
2. Write a C program to demonstrate string handling functions using built-in and user defined functions.

Module-5: Functions
1. Write a C program to demonstrate user defined functions.
2. Write a C program to demonstrate nested functions.

Module-6: Pointers
1. Write a C program to demonstrate arithmetic expressions using pointers.
2. Write a C program to demonstrate Pointers to Arrays.
3. Write a C program to demonstrate manipulate strings using pointers.
4. Write a C program to demonstrate dynamic memory allocation.

Module-7: Advanced Pointers
1. Write a C program to demonstrate Call-by-value, Call-by-reference.
2. Write a C program to demonstrate recursive function.
3. Write a C program to demonstrate Functions with Storage Classes (Static).

Module-8: Structures
1. Write a C program to demonstrate structures.
2. Write a C program to demonstrate structures within structures.
3. Write a C program to demonstrate pointer to a structure.
4. Write a C program to demonstrate unions.

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Module-9: Files

1. Write a C program to demonstrate I/O operations on files.
2. Write a C program to demonstrate concatenating two files.
3. Write a C program to demonstrate copy content of one file to another file.

Case Study:

Select any one application mentioned below.

Note: A report has to be submitted by every student at the end of the semester that includes design, coding, output, etc.

1. Develop a library management system to add, delete, and search for books efficiently.
2. Develop an ATM system to check balance, deposit money, and withdraw funds.
3. Develop a C program to calculate salary increments using a lookup table which stores the percentage of increment based on the current salary.
4. Develop a voting system where users can vote for candidates and view results.
5. Develop a basic calculator for arithmetic operations like addition, subtraction, multiplication, and division.
6. Develop a contact management system to store and manage details like name, phone number, and email.
7. Develop a banking system supporting multiple users for account management and transactions.
8. Develop a C program to calculate SGPA and CGPA based on students' marks across semesters.
9. Develop a registration page in C using file handling to securely store usernames and passwords.
10. Develop an encryption and decryption algorithm to securely transform and restore data by using the GNU C Library: crypt.

Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", 2nd Edition, 2015, Pearson Education India, ISBN: 978-93-3254-944-9.
2. Yashavant P. Kanetkar, "Let Us C", 16th Edition, 2019, BPB Publications, ISBN: 978- 93-8728-449-4.
3. E. Balaguruswamy, "Programming in ANSI C", 8th Edition, 2019, McGraw Hill Education, ISBN: 978-93-5316-513-0.
4. Pradip Dey, Manas Ghosh, "Programming in C", 2nd Edition, 2018, Oxford University Press, ISBN: 978-01-9949-147-6.
5. N.B. Venkateswarulu, "C programming", 1st Edition, S.Chand Publishing, 2017, ISBN: 978-93-525-3356-5.
6. Jacqueline A Jones and Keith Harrow, "Problem Solving with C", Pearson Education. ISBN: 978-93-325-3800-9.

Web References (e-Resources):

1. https://nptel.ac.in/courses/106105171
2. https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/pages/lecture-notes/
3. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013843237039374336345 17_shared/overview
4. https://cse02-iiith.vlabs.ac.in/List%20of%20experiments.html

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Annexure-VIII

IT ESSENTIALS
I Year B. Tech. I semester
(Branch: Electrical & Electronics Engineering)

Course Code:

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to:		**Module No.**
C01:	Identify the peripherals of a computer.	1
C02:	Demonstrate the installation process of operating systems like MS Windows, LINUX.	2
C03:	Make use of Office suite that comprises with various applications to create documents, and captivating presentations.	3
C04:	Make use of Office suite that comprises with various applications to organize & analyse data.	4
C05:	Categorize various UNIX/LINUX Commands to work on a modern operating system and Make use of LaTeX tool to prepare research articles.	5

Module-1: Hardware Concepts

1. Identify the peripherals of a computer, components in a CPU and its functions.
2. Draw the block diagram of the CPU along with the configuration of each peripheral.
3. Disassemble and assemble the PC back to working condition.

Module-2: Software Installations and configurations

1. Install operating systems like LINUX and MS windows on a personal computer.
2. The system should be configured as dual boot with both MS windows and LINUX.

Module-3: Word and PowerPoint

1. Creating Documents: Formatting Fonts/Texts, page layout, Applying Text effects, Character Spacing, Borders and Colours, Inserting Header and Footer, equation editor.
2. Creating Power Point: Student should work on basic power point utilities and tools to create basic power point presentation. PPT Orientation, Slide Layouts, Inserting Text, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting Images, Tables and charts.

Module-4: Spreadsheets

1. Spreadsheet Orientation: Accessing, overview of toolbars, saving spreadsheet files, Using help and resources. Creating a Scheduler, Gridlines, Format Cells, Summation, auto fill, Formatting Text, Renaming and Inserting worksheets, Hyper linking.
2. Excel Calculation: Calculating Average, Cell Referencing, Excel Formula, std. deviation, Charts, Count Function, Sorting, Conditional formatting, Excel Advanced-sumif, VLOOKUP, and Pivot Table.
3. Software as a service (SaaS): Usage of online office suite.

Module-5: UNIX/LINUX Commands and LaTeX

1. Study and practice on file system, handling files with commands, syntax, usage, application.
2. Installation of LaTeX and preparation of research article.

Reference Books:

1. IT Essentials: PC Hardware and Software Companion Guide, Third Edition, David Anfinson, Ken Quamme.
2. UNIX concepts and applications by Sumitabha Das, TMH Publications.

Web References:

1. **https://www.javatpoint.com/**

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Annexure-I

Python Programming
I Year B. Tech. II semester
(Common to CSE, CSE (AI&ML), IT Branches)

Course Code:	L	T	P	C
	4	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to:	
C01:	**Understand** the historical development, necessity, applications, and basic concepts of python programming
C02:	**Identify** and implement appropriate control structures to solve a particular programming problem
C03:	**Examine** various data structures and apply to solve real world problems.
C04:	**Build** simple functions and packages used in python for solving real world problems.
C05:	**Outline** Object Oriented concepts in python and illustrate Exception handling

UNIT-I	**8 Lectures**
Introduction: History of Python, Need of Python Programming, Applications of Python, Variables, Assignment, Comments, Keywords, Data types, Input-Output, Indentation.	
TextBook-1: Chapter 3 (S-3.1 – S-3.12)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Understand the Evolution of Python [L2] 2. Recall the Need and Applications of Python [L1] 3. Outline python's Input and Output Functions[L2]	

UNIT-II	**10 Lectures**
Operators and Expressions: Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations **Control Flow-** if, if-elif-else, for, while, break, continue, pass	
TextBook-1: Chapter 3 (S-3.12), Chapter 4 (S-4.1 – S-4.7)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Illustrate python operators: arithmetic, comparison, assignment, logical, bitwise, membership, identity [L2] 2. Make use of control flow statements: if, if-elif-else, for, while, break, continue, pass. [L3]	

UNIT-III	**12 Lectures**
Data Structures: Strings, Lists, Tuples, Sets, Dictionaries. Data Structures manipulations - create, Index, Negative indexing, Slicing, update, add elements, delete or remove elements, operations, Comprehension, Membership Test, Iteration.	
TextBook-1: Chapter 6 (S-6.1 – S-6.9), Chapter 8 (S-8.1 – S-8.6)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Understanding basic operations on lists, including indexing and slicing [L2] 2. Utilize methods of lists, tuples, sets, and dictionaries to solve problems [L3] 3. Compare and apply appropriate use cases for lists, tuples, sets, and dictionaries. [L2]	

UNIT-IV	**10 Lectures**
Functions - Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Lambda Functions, Function Returning Values, Built-in functions, Scope of the Variables in a Function - Global and Local Variables.	

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Modules: Creating modules, import statement, from…import statement, namespaces. **Python packages:** Introduction to PIP, Installing Packages via PIP
TextBook-1: Chapter 5 (S-5.1 – S-5.8,5.12)
Learning Outcomes:
At the end of the unit, the student will be able to
1. Understanding and implementing various types of function arguments and scopes in Python. [L2] 2. Utilize Python modules to understanding the import mechanisms [L3]

UNIT-V	**11 Lectures**
Object Oriented Programming (OOP) in Python: Classes and Objects, Class Method and self Argument, The __init__() Method (The Class Constructor), Class Variables and Object Variables, Public and Private Data Members, Inheritance, Overriding Methods. **Error and Exceptions:** Introduction to Errors and Exceptions, Handling Exception, try except block, finally block, Raising Exceptions. **File Handling**: Type of files, Opening and Closing files, Reading and Writing files.	
TextBook-1: Chapter 9 (S-9.1 – S-9.8), Chapter 10 (S-10.1 – S-10.3) TextBook-1: Chapter 7 (S-7.1 – S-7.5), Chapter 12 (S-12.1 – S-12.10)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Understand and implement classes, methods, and the 'self' variable in Python [L2] 2. Demonstrate concepts of inheritance, method overriding, and data hiding in OOP [L2] 3. List the differences between errors and exceptions, and handle exceptions using try-except blocks [L1] 4. Illustrate file operations including reading, writing, and manipulating file pointers in Python. [L2]	

Text Books:
1. Reema Thareja, "Python Programming: Using Problems Solving Approach", Oxford University Press, 2017 2. Fundamentals of Python First Programs, Kenneth. A. Lambert, Cengage.
Reference Books:
1. Fundamentals of Data Structures using Python, P Lalitha Surya Kumari, P. S. Avadhani, Lambert Academic Publishing 2. Introduction to Python Programming, Gowrishankar.S, Veena A, CRC Press. 3. Introduction to Programming Using Python, Y. Daniel Liang, Pearson.
Web References:
1. https://www.tutorialspoint.com/python3/python_tutorial.pdf 2. https://www.python.org/doc/

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Annexure-II

Fundamentals of Computers
I Year B. Tech. I semester
(Common to CSE, CSE (AI&ML), IT Branches)

Course Code:	L	T	P	C
	4	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to:	
C01:	Identify different I/O devices and their usage.
C02:	Compare different computer memory with their efficiency.
C03:	Relate different computer software's and programming languages for solving problems.
C04:	Summarize the use of operating system, database system, and computer network in the field of computing in engineering.
C05:	Infer the methods and applications of artificial intelligence (AI), machine learning (ML) and data science.

UNIT-I **10 Lectures**

Introduction to computers: Computers, Stored Program Concept, Classification of Computers, Evolution and Development of Computers, Application Areas of Computers, Features/Characteristics of Computers, Basic Organization of a Computer.

Input and Output Devices: Input Devices, Output Devices, Soft Copy Devices, Hard Copy Devices, Voice Response Systems, Biometric Devices

TextBook-1: Chapter 1 (S-1.1 – S-1.7)

https://oer-studentresources.gesci.org/wp-content/courses/Computer/CS-F1-Introduction-to-computers/evolution_and_development_of_computers.html (Development of Computers)

TextBook-1: Chapter 2 (S-2.1 – S-2.6)

Learning Outcomes:

At the end of the unit, the student will be able to

1. Outline characteristics and classification of computers (L2)
2. Demonstrate different configurations of software and hardware used in computer (L2)
3. Model the computer by organizing different computer peripherals such as I/O, CPU, etc. (L3)

UNIT-II **10 Lectures**

Computer Memory: Introduction, Memory Organization, Memory Hierarchy, Sequential and Random Access, Processor Registers, Cache Memory, Primary Memory,Secondary Storage Devices, Magnetic Tapes, Floppy Disks, Hard Disks, External Hard Disks, Optical Disks, USB Flash Drives, Memory Cards, Mass Storage Devices.

TextBook-1: Chapter 3 (S-3.1 – S-3.16)

Learning Outcomes:

At the end of the unit, the student will be able to

1. Summarize computer memory hierarchy. (L2)
2. Classify different memory w.r.t. speed and cost. (L2)
3. Illustrate different external storage devices and its applications. (L2)

UNIT-III **10 Lectures**

Computer Software: Introduction to Computer Software, Classification of Computer Software, System Software, Application software, Graphics Software, Multimedia Software, Database Management Software, Firmware, Middleware, Procuring Computer Software.

Problem Solving Using Computers: Introduction, Program Development Life Cycle, Program Design Tools, Programming Languages, Generations of Programming Languages, Categorization of High-level Languages, Some Popular High-level Languages, Apps.

TextBook-1: Chapter 6 (S-6.1 – S-6.7)

TextBook-1: Chapter 7 (S-7.1 – S-7.7)

https://www.builder.ai/glossary/app#:~:text=An%20app%20is%20a%20type,enhance%20productivity%20and%20streamline%20communication (Apps)

Learning Outcomes:

At the end of the unit, the student will be able to

1. Compare different computer software's (L2)
2. Summarize different programming languages for solving problems. (L2)
3. Contrast Structured Programming Language, Logic-oriented Programming Language, and

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Object-oriented Programming. (L2)

UNIT-IV **12 Lectures**

Fundamental Operating Systems: Introduction, History of Operating Systems, Functions of Operating Systems, Types of Operating Systems, Providing User Interface, Popular Operating Systems

Database Systems: File-Oriented Approach, Database-oriented Approach, Database Views, Three-schema Architecture, Database Models, Components of Database Management, Retrieving Data Through Queries.

Computer Networks: Introduction to Computer Networks, Types of Networks, Physical Components of a Network, Wired Media, Wireless Media, Networking Devices, Network Topologies, Wireless Networks.

TextBook-2: Chapter 11 (S-11.1 / P-238 – S-11.11 / P-258)
TextBook-1: Chapter 9 (S-9.1 – S-9.7), Chapter 10 (S-10.1 – S-10.8)

Learning Outcomes:

At the end of the unit, the student will be able to

1. Explain fundamentals of operating systems. (L2)
2. Illustrate database system applications and its design concepts. (L2)
3. Outline fundamentals of computer networks and its applications. (L2)

UNIT-V **8 Lectures**

Introduction to Artificial Intelligence & Machine Learning (AI&ML) and Data Science: Introduction to AI & ML, and Data Science, Use Cases in Business and Scope, Modelling Concepts, CRISP-DM Method

1. https://community.aws/content/2drbbXokwrIXivItJ8ZeCk3gT5F/introduction-to-artificial-intelligence-and-machine-learning?lang=en **(Artificial Intelligence)**
2. https://www.javatpoint.com/machine-learning-models **(Machine Learning)**
3. https://www.techtarget.com/searchenterpriseai/feature/Top-12-machine-learning-use-cases-and-business-applications **(Machine Learning)**
4. https://www.heavy.ai/learn/data-science **(Data Science)**
5. https://www.sv-europe.com/crisp-dm-methodology/ **(CRISP-DM Method)**

Learning Outcomes:

At the end of the unit, the student will be able to

1. Outline the main methods and applications of artificial intelligence (AI) concepts. (L2)
2. Outline the main methods and applications of machine learning (ML) concepts. (L2)
3. Outline the main methods and applications of data science concepts. (L2)

Text Books:

1. Reema Thareja, Fundamentals of Computers, Second Edition, Oxford University Press, 2019.
2. E Balagurusamy, Fundamentals of Computers, Tata McGraw Hill Education Private Limited, 2009

Reference Books:

1. Raghu Ramakrishnan, Johannes Gehrke, Database Management Systems, 4th Edition, McGraw-Hill, 2002.
2. Andrew S. Tanenbaum, Modern Operating Systems, 2nd edition, PHI, 1995.

Web References:

1. https://oer-studentresources.gesci.org/wp-content/courses/Computer/CS-F1-Introduction-to-computers/evolution_and_development_of_computers.html (Development of Computers)
2. https://www.builder.ai/glossary/app#:~:text=An%20app%20is%20a%20type,enhance%20productivity%20and%20streamline%20communication (Apps)
3. https://www.geeksforgeeks.org/what-is-an-operating-system/ (Operating System)
4. https://www.javatpoint.com/computer-network-tutorial (Computer Network)
5. https://community.aws/content/2drbbXokwrIXivItJ8ZeCk3gT5F/introduction-to-artificial-intelligence-and-machine-learning?lang=en **(Artificial Intelligence)**
6. https://www.javatpoint.com/machine-learning-models **(Machine Learning)**
7. https://www.techtarget.com/searchenterpriseai/feature/Top-12-machine-learning-use-cases-and-business-applications **(Machine Learning)**
8. https://www.heavy.ai/learn/data-science **(Data Science)**
9. https://www.sv-europe.com/crisp-dm-methodology/ **(CRISP-DM Method)**

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Annexure-III

Python Programming Lab
I Year B. Tech. II semester
(Common to CSE, CSE (AI&ML), IT Branches)

L	T	P	C
0	0	3	1.5

Course Code:

Course Outcomes: At the end of the Course, the student shall be able to:		**Module No.**
C01:	Understand core programming basics and various Operators of Python	1,2
C02:	Implement programs using conditional statements and loops and strings.	3,4
C03:	Develop functions and strings to perform simple tasks.	5,6
C04:	Make use of various data structures like lists, tuples, sets and dictionaries.	7,8,9
C05:	Implement Python programs with files, Classes and objects	10,11

Module-1: Basics of Python

a) Write a program to display the statements.
b) Demonstrate about fundamental Data types in Python Programming. (i.e., int, float, complex, bool and string types)
c) Write a Python program to demonstrate various type conversion functions.
d) Write a program to demonstrate the inbuilt Math function

Module-2: Operators in Python

a) Demonstrate the following Operators in Python with suitable examples.
i) Arithmetic Operators ii) Relational Operators iii) Assignment Operators iv) Logical Operators v) Bit wise Operators vi) Ternary Operator vii) Membership Operators viii) Identity Operators

Module-3: Conditional Branching Statements

a) Write a program to check whether the given number is even or odd
b) Write a program to read marks of a student and display the corresponding grade
c) Write a program to find the largest element among the given numbers (multi-way if-elif-else statements.)

Module-4: Looping/Iterative Statements

a) Implement the following programs using while loop and for loop
i. Display all prime numbers up to n.
ii. Print the nth multiplication table.
iii. Print different patterns using loops:
b) Demonstrate the following control transfer statements in Python with suitable examples.
i. break ii. continue iii. Pass

Module-5: Functions

a) Write a function to find the multiplication of two numbers and demonstrate the usage of parameters and arguments of a function.
b) Write a program to define a function using default arguments.
c) Demonstrate lambda functions in Python with suitable example programs.

Module-6: Strings

a) Write a program to manage and analyse customer feedback using string operations include:
i. Create feedback with name, email, comment
ii. Collecting feedback.
iii. Normalizing feedback (e.g., removing extra spaces, converting to lowercase).
iv. Extracting key in formation (e.g., names, email addresses, and comments).

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v. Searching for keywords.
vi. Replacing certain words.
vii. Formatting feedback for display.
viii. Summarizing feedback.

Module-7: Lists:

a) Write a program to create a list and perform the following operations:
   i. + ii. * iii. slicing iv. del
b) Inventory Management: You have a list of items in your warehouse along with their quantities. Write a program to find out which items are low in stock (quantity less than 10). (use only comprehensions)
c) Employee Performance: You have a list of employee names and their corresponding performance scores. Write a program to sort the list based on the performance scores in descending order.
d) Sales Analysis: you have a list of sales figures for the past week. Write a program to find the total sales, the highest sale, the lowest sale, and the average sale.
e) Write a program to calculate the length of each element in a list using map function in python.

Module-8: Tuples

a) Write a program to return the top n's most frequently occurring chars and their respective counts. e.g. string=aaaaaabbbbcccc, n=2 should return [(a 6) (b 4)].
b) Write a program to create n iterables of varied sizes and group the values using zip function in python.
c) Student Information: Write a program to create a list of tuples where each tuple contains the student ID, name, and grade and find the student with the highest grade.
d) Course Enrolment: Write a program to create list of tuples where each tuple contains the course ID and the number of students enrolled and find the total number of students enrolled across all courses
e) Faculty Information: Write a program to create a list of tuples where each tuple contains the faculty ID, name, and department and find all faculty members in a given department.
f) Library Book Tracking: You have a list of tuples where each tuple contains the book ID, title, and number of copies available. Write a program to find all books with fewer than 5 copies available.

Module-9: Sets & Dictionaries

a) Write a program to create two sets and perform the following operations:
   i. Union ii. Intersection iii. Difference iv. Asymmetric Difference
b) Write a program to generate a dictionary that contains numbers (between 1 and n) in the form of (x,x*x).
c) Write a program to implement a shopping cart where you can add items with their prices and quantities, and then calculate the total cost.
d) Banking System: Write a program to create dictionary with customer name and balance and Retrieve the balance for a given customer, Deposit a specified amount into a customer's account, Withdraw a specified amount from a customer's account if sufficient balance is available, Transfer a specified amount from one customer's account to another's and Remove a customer from the bank's system.

Module-10: Classes and objects

a) Create a class to represent menu items in a restaurant with attributes like name, price, and category. Implement methods to display menu details and calculate the total cost of a selected list of items.

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b) Write a program to read 3 subject marks and display pass or failed using class and object.

Module-11: Files

a) Write a program to copy the contents of a file to another file.

b) Write a program to compute the number of characters, words and lines in a file.

Case Study:

Select any one application mentioned below

Note: A report has to be submitted by every student at the end of the semester that includes design, coding, output, etc.

1. Design a Python program to manage inventory, process orders, and handle customer information for an online store.
2. Create a library system to track books, manage member accounts, and handle book loans and returns.
3. Implement a personal finance management tool to track income, expenses, and generate monthly reports.
4. Create a system to manage student grades, calculate GPAs, and generate academic reports.
5. Develop a Python-based movie recommendation system using collaborative filtering.
6. Build a to-do list application that allows users to add, update, delete, and prioritize tasks..
7. Build a patient management system to handle appointments, medical records, and billing.
8. Design a digital menu for a restaurant with options for ordering, bill generation, and inventory management.
9. Implement a fitness tracking application to log workouts, track progress, and suggest exercise plans.
10. Build a secure online voting platform with user authentication and vote tallying.
11. Create a program to manage recipes, including ingredients, instructions, and nutritional information.
12. Build a travel planning application to manage itineraries, bookings, and budget tracking.
13. Develop an e-learning application with course creation, student enrolment, and progress tracking.
14. Build a car rental management system to handle bookings, returns, and vehicle maintenance.
15. Build a budget planning application to track expenses, income, and financial goals.
16. Develop a cryptocurrency tracking application to monitor prices, market trends, and portfolio performance.

Reference Books:

1. Python Programming: Using Problem Solving Approach by Reema Theraja , Oxford publications
2. Ashok N Kamthane, Amit Ashok Kamthane, *Programming and Problem Solving with Python*, 1st Edition, McGraw Hill Education (India), 2018.

Web References:

1. https://www.python.org/doc/
2. https://www.w3schools.com/python/python_reference.asp
3. https://thepythonguru.com/
4. https://www.programiz.com/python-programming

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Annexure-IV

Computer Engineering Workshop
I Year B. Tech. I semester
(Common to CSE, CSE (AI&ML), IT Branches)

Course Code:

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to:		**Module No.**
C01:	Identify the peripherals of a computer.	1
C02:	Demonstrate the installation process of operating systems like MS Windows, LINUX.	2
C03:	Make use of MS-Office suite that comprises of various applications to create documents, organizes & analyses data and captivating presentations.	3
C04:	Categorize various UNIX/LINUX Commands to work on a modern operating system	4
C05:	Experiment with GIT Commands and make use of LaTeX to prepare research articles.	5

Module-1: Hardware Concepts

1. Identify the peripherals of a computer, components in a CPU and its functions.
2. Draw the block diagram of the CPU along with the configuration of each peripheral.
3. Disassemble and assemble the PC back to working condition.

Module-2: Software Installations

1. Install operating systems like LINUX and MS windows on a personal computer.
2. The system should be configured as dual boot with both MS windows and LINUX.

Module-3: Office Suite

1. Creating Documents: Formatting Fonts/Texts, page layout, Applying Text effects, Character Spacing, Borders and Colours, Inserting Header and Footer, equation editor.
2. Spreadsheet Orientation: Accessing, overview of toolbars, saving spreadsheet files, Using help and resources. Creating a Scheduler, Gridlines, Format Cells, Summation, auto fill, Formatting Text, Renaming and Inserting worksheets, Hyper linking.
3. Excel Calculation: Calculating Average, Cell Referencing, Excel Formula, std. deviation, Charts, Count Function, Sorting, Conditional formatting, Excel Advanced-sumif, VLOOKUP, and Pivot Table.
4. Creating Power Point: Student should work on basic power point utilities and tools to create basic power point presentation. PPT Orientation, Slide Layouts, Inserting Text, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting Images, Tables and charts.
5. Software as a service (SaaS): Usage of online office suite.

Module-4: UNIX/LINUX Commands

1. Study and practice on file system, handling files with commands, syntax, usage, application.
2. Practice on vi editor.
3. Study and practice on shells/shell programming with relevant programming constructs, syntax, usage, application.

Module-5: GIT Commands and LaTeX

1. Installation of GIT, Branch in Git Basic GIT Commands.
2. Installation of LaTeX and preparing research articles by creating overleaf account.
3. Introduction to Scratch Programming - Introduction, Stage, Sprite, Script, Block Palette.

Reference Books:

1. IT Essentials: PC Hardware and Software Companion Guide, Third Edition, David Anfinson, Ken Quamme.
2. UNIX concepts and applications by Sumitabha Das, TMH Publications.
3. Shell programming by Yashwanth Kanetkar.

Web References:

1. https://www.javatpoint.com/

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Annexure-V

Problem solving using C
I Year B. Tech. I semester
(Common to CSE, CSE (AI&ML), IT, ECE, and EEE (I-II) Branches)

Course Code:	L	T	P	C
	4	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
C01:	Explain the basic constructs of C through the use of simple applications.
C02:	Demonstrate the utilization of arrays and strings in the development of C programs.
C03:	Utilize functions and pointers to construct various applications in C.
C04:	Apply concepts of structures and unions to build and implement C applications.
C05:	Develop applications using sequential and random-access file processing techniques.

UNIT-I	10 Lectures
Introduction to C: Basic structure of C program, Constants, Variables and data types, Operators and Expressions, Arithmetic Precedence and associativity, Type Conversions. Managing Input and Output Operations Formatted Input, Formatted Output.	
TextBook-1: Chapter 2 (S-2.1 – S-2.12)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Outline the Basic Structure and Components of C Programs. (L2) 2. Demonstrate Variables, Data Types, Operators, and Expressions. (L2) 3. Illustrate Input and Output Operations. (L2)	

UNIT-II	12 Lectures
Decision Making, Branching, Looping: Decision making with if statement, Simple if statement, The if...else statement, Nesting of if...else statement, the else... if ladder, switch statement, the (? :) operator, the goto statement, The while statement, the do statement, the for statement, Jumps in Loops. **Arrays & Strings:** One, Two-dimensional Arrays, multi-dimensional Arrays, Character Arrays. Declaration and Initialization of Strings, reading and writing of strings, string handling functions.	
TextBook-1: Chapter 3 (S-3.1 – S-3.8), TextBook-2:Chapter 13,14,15,16(PP:215-283)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Classify Decision Making and Branching (L2) 2. Interpretation of Looping Constructs (L2) 3. Summarize Arrays and Strings (L2)	

UNIT-III	10 Lectures
Function and Dynamic Memory Allocation: Functions: Designing structured programs, declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, passing arrays to functions, recursion. Introduction to Pointers, Pointer Arithmetic, Pointers for Inter-Function Communication, passing pointers to functions, call by reference, Dynamic Memory Allocation.	
TextBook-1: Chapter 4 (S-4.1 – S-4.11), Chapter 5 (S-5.1 – S-5.12)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Utilize Functions (Understand and Implement Functions, Utilize Various Function Types, Advanced Function Techniques) (L3) 2. Experiment with Pointers (Basic Pointer Operations, Pointers and Data Structures) (L3) 3. Explain Advanced Pointer Usage (Pointers in Functions, Pointers to Complex Data Types) (L2)	

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UNIT-IV	10 Lectures
Structure and Unions: Defining a structure and union, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, arrays of structures, arrays within structures, structures within structures, definition and usage of union, structures and unions using functions, size of structures and bit-fields. The Type Definition (Type def), Enumerated Types.	
TextBook-1: Chapter 6 (S-6.1 – S-6.9)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Define Structures and Build C programs using Structures. (L3) 2. Explain Complex Data Structures. (L2) 3. Explain Unions and Bit-Fields. (L2)	

UNIT-V	8 Lectures
File handling: Introduction to Files, Modes of File operations, Text and Binary Files, Defining and opening a file, closing a file, Input/ Output operations on files, Error handling during I/O operations, random access to files and Command Line Arguments, user defined header files.	
TextBook-2: Chapter 19 (PP:325-348)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Outline File Operations. (L2) 2. Summarize Error Handling and Random Access. (L2) 3. Utilize Command Line Arguments. (L3)	

Text Books:
1. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", 2nd Edition, 2015, Pearson Education India, ISBN: 978-93-3254-944-9. 2. Yashavant P. Kanetkar, "Let Us C", 16th Edition, 2019, BPB Publications, ISBN: 978-93-8728-449-4.
Reference Books:
1. N. B. Venkateswarlu, E. V. Prasad, "C and Data Structures", 1st Edition, S. Chand Publishing, 2010, ISBN: 978-93-525-3356-5. 2. Pradip Dey, Manas Ghosh, "Programming in C", 2nd Edition, 2018, Oxford University Press, ISBN: 978-01-9949-147-6. 3. Jacqueline A. Jones and Keith Harrow, "Problem Solving with C", Pearson Education. ISBN: 978-93-325-3800-9. 4. E. Balagurusamy, "Programming in ANSI C", 8th Edition, 2019, McGraw Hill Education, ISBN: 978-93-5316-513-0.
Web References (e-Resources):
1. https://nptel.ac.in/courses/106105171 2. https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/pages/lecture-notes/ 3. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013843237039374336345 17_shared/overview 4. https://cse02-iiith.vlabs.ac.in/List%20of%20experiments.html

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Annexure-VI

Web Technologies Fundamentals lab
I Year B. Tech. II semester
(Common to CSE, CSE (AI&ML), IT Branches)

Course Code:	L	T	P	C
	0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to		**Module No.**
C01:	**Develop** professional web pages for an application using HTML elements like lists, navigations, tables, various form elements, and embedded media, including images, audio, and video.	**1,2**
C02:	**Build** inline, internal, and external CSS to enhance the visual presentation of web pages, including layout, fonts, colors, and backgrounds.	**3,4**
C03:	**Utilize** JavaScript to develop interactive HTML web pages and validate form data.	**5,6,7**
C04:	**Apply** JavaScript functions and events to enhance user interaction and provide a dynamic user experience.	**8,9**
C05:	**Experiment with** XML files to store and display structured data and write a DTD to perform well-formed and validated XML documents.	**10**

Module-1:
Design a web page using Basic HTML Elements – Structure of HTML, Headings, Paragraph, Division and Span, List, Link, Image, Table, Form, Input, Iframe, and Media Elements.

Module-2:
Design the following static web pages required for an online book store website.

(a) HOME PAGE:
i) The static home page must contain three frames.
Top frame: Logo and the college name and links to the Home page, Login page, Registration page, Catalogue page, and Cart page (the description of these pages will be given below). Left frame: At least four links for navigation, which will display the catalogue of respective links. For e.g.: When you click the link "CSE" the catalogue for CSE Books should be displayed in the Right frame. Right frame: The pages to the links in the left frame must be loaded here. Initially, this page contains a description of the website.
ii) Add media content in a frame using audio, video, and iframe elements to the Home page of an online book store website. The page should include:
1) Audio Element: An audio player to play background music or a podcast.
2) Video Element: A video player to display a promotional video about the book store.
3) Iframe Element: An iframe to embed a Google Maps location of the book store.

(b) LOGIN PAGE

(c) CATALOGUE PAGE: The catalogue page should contain the details of all the books available on the website in a table: The details should contain the following:
i) Snapshot of Cover Page. ii)Author Name. iii)Publisher.
iv) Price. v)Add to cart button.

(d) REGISTRATION PAGE: Create a "registration form "with the following fields
i) Username: Text input field
ii) Password: Password input field
iii) Email: Email input field
iv) Phone number: Text input field
v) Birthday: Date picker
vi) Favorite Color: Color picker
vii) Gender: Select an element with options (Male, Female, Other).

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Module-3:
Develop and demonstrate the usage of inline, internal, and external style sheets using CSS.

Module-4:
Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the properties of the font of the capital (colour, bold, and font size).

Module-5:
Develop and demonstrate JavaScript with POP-UP boxes and functions for the following problems:

a) Input: Click on the Display Date button using onclick( ) function
   Output: Display the date in the textbox.
b) Input: A number n obtained using prompt
   Output: Factorial of n number using alert.
c) Input: A number n obtained using prompt
   Output: A multiplication table of numbers from 1 to 10 of n using alert.
d) Input: A number n obtained using prompt and add another number using confirm
   Output: Sum of the entire n numbers using alert.

Module-6:
Write JavaScript to validate the following fields of the Registration page.

(a) First Name (Name should contain alphabets and the length should not be less than 6 characters).
(b) Password (Password should not be less than 6 characters in length).
(c) E-mail ID (should not contain any invalid and must follow the standard pattern name@domain.com)
(d) Mobile Number (The phone number should contain 10 digits only).
(e) Last Name and Address (should not be Empty).

Module-7:
Write an HTML page including any required JavaScript that takes a number from the text field in the range of 0 to 999 and shows it in words. It should not accept four and above digits, alphabets, and special characters.

Module-8:
Create an 'Employee' class extending from a base class 'Person'. The task should include:

(a) Create a class 'Person' with attributes 'name' and 'age', and add a constructor to initialize these values.
(b) Create a class 'Employee' that extends 'Person' and includes an additional attribute 'role,' with a constructor to initialize 'name,' 'age,' and 'role.'

Module-9:
Create an array of objects representing book details in an online book store. Each object should include the book title, author, genre, and price. Render the details of the books on the page using this array, demonstrating array creation, accessing array elements, and applying array methods.

Module-10:
Write an XML file which will display the Book information which includes the following:

a) Title of the Book b)Author Name c)ISBN Name
d)Publisher Name e)Edition f)Price

Write a Document Type Definition(DTD) to validate the above XML file.

Case Study:
Select any one practical applications mentioned below.
Note: A report has to be submitted by every student at the end of the semester, including design, coding, output, etc.

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1. **Portfolio Website:** Create a personal portfolio website showcasing projects, skills, and experience using HTML, CSS, and JavaScript for interactive features.
2. **Responsive Blog:** Design a responsive blog template with multiple pages, utilizing HTML for structure, CSS for styling, and JavaScript for dynamic content.
3. **E-commerce Site:** Develop a basic e-commerce website with product listings, shopping cart functionality, and user authentication using HTML, CSS, and JavaScript.
4. **Quiz Game:** Create an interactive quiz game with multiple-choice questions, scoring, and feedback using HTML, CSS, and JavaScript for functionality.
5. **To-Do List:** Develop a to-do list application allowing users to add, edit, and delete tasks, with data persistence using JavaScript local storage.
6. **Interactive Resume:** Design a dynamic resume with sections for education, experience, and skills, including interactive elements powered by JavaScript.
7. **Photo Gallery:** Create an interactive photo gallery with image lightbox effects, using CSS for styling and JavaScript for functionality.
8. **Recipe Finder:** Build a recipe search application that fetches and displays recipes from an API, using JavaScript for dynamic content updates.
9. **Expense Tracker:** Develop an expense tracker app to log and categorize expenses, with data visualization using charts and graphs created with JavaScript.
10. **Event Countdown:** Create a countdown timer for upcoming events with HTML structure, CSS styling, and JavaScript for the timer logic.
11. **Contact Form:** Create a contact form with validation and submission handling using JavaScript, styled with CSS to match the site's theme.
12. **Memory Game:** Develop a memory matching game with cards that flip and match, using CSS for design and JavaScript for game logic.
13. **Interactive Story:** Design an interactive storytelling website where users make choices that affect the narrative, using JavaScript for decision logic.
14. **Fitness Tracker:** Build a fitness tracker to log workouts and track progress, with dynamic charts and data visualization using JavaScript.
15. **Task Manager:** Create a task manager application with features for adding, editing, and prioritizing tasks, using JavaScript for interactivity.
16. **Interactive Timelines:** Design interactive timelines to visualize historical events or project milestones, using HTML, CSS, and JavaScript.
17. **Product Landing Page:** Develop a product landing page with animations and interactive elements, using CSS for styling and JavaScript for effects.
18. **Calculator:** Build a fully functional calculator with basic arithmetic operations, using JavaScript for logic and CSS for design.
19. **Job Board:** Develop a job board where users can post and search for jobs, with dynamic content updates using JavaScript.
20. **Interactive Form:** Create a multi-step interactive form with validation and progress indicators, using JavaScript for form handling and CSS for styling.

References:

1. Internet and Web Technologies by Raj Kamal, Tata McGraw-Hill.
2. Programming the World Wide Web by Robert W. Sebesta, Pearson Education.
3. An Introduction to Web Design and Programming by Paul S Wang, Sanda S Katila, 1st Edition, Cengage Learning.

Web Links:

1. https://onlinecourses.swayam2.ac.in/nou24_cs18/preview
2. https://infyspringboard.onwingspan.com/en/app/toc/lex_17739732834840810000_shared/overview (HTML5)
3. https://infyspringboard.onwingspan.com/en/app/toc/lex_18109698366332810000_shared/overview (Javascript)

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Annexure-VII

Problem Solving using C Lab
I Year B. Tech. I semester
(Common to CSE, CSE (AI&ML), IT, ECE, and EEE (I-II) Branches)

Course Code:

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to:		**Module No.**
C01:	Outline the use of basic constructs of C for simple applications.	**1,2,3**
C02:	Develop C programs for simple applications using Arrays and Strings.	**4**
C03:	Illustrate concepts such as functions, recursion, and pointers with suitable examples.	**5,6,7**
C04:	Build C programs involving Structures and Unions.	**8**
C05:	Develop applications using sequential and random-access file processing.	**9**

Module-1: I/O and Data Types
1. Write a C program to demonstrate Format Specifiers and Input/Output Statements.
2. Write a C program to demonstrate various Data Types.

Module-2: Operators and Expressions
1. Write a C program to demonstrate various Operators including Bitwise Operator.
2. Write a C program to demonstrate Arithmetic Expressions and Type Casting.

Module-3: Control Statements
1. Write a C program to demonstrate decision making statements.
2. Write a C program to demonstrate iterative statements.
3. Write a C program to demonstrate break and continue Statement.

Module-4: Arrays
1. Write a C program to demonstrate arrays (one-dimensional and two-dimensional).
2. Write a C program to demonstrate string handling functions using built-in and user defined functions.

Module-5: Functions
1. Write a C program to demonstrate user defined functions.
2. Write a C program to demonstrate nested functions.

Module-6: Pointers
1. Write a C program to demonstrate arithmetic expressions using pointers.
2. Write a C program to demonstrate Pointers to Arrays.
3. Write a C program to demonstrate manipulate strings using pointers.
4. Write a C program to demonstrate dynamic memory allocation.

Module-7: Advanced Pointers
1. Write a C program to demonstrate Call-by-value, Call-by-reference.
2. Write a C program to demonstrate recursive function.
3. Write a C program to demonstrate Functions with Storage Classes (Static).

Module-8: Structures
1. Write a C program to demonstrate structures.
2. Write a C program to demonstrate structures within structures.
3. Write a C program to demonstrate pointer to a structure.
4. Write a C program to demonstrate unions.

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Module-9: Files

1. Write a C program to demonstrate I/O operations on files.
2. Write a C program to demonstrate concatenating two files.
3. Write a C program to demonstrate copy content of one file to another file.

Case Study:

Select any one application mentioned below.

Note: A report has to be submitted by every student at the end of the semester that includes design, coding, output, etc.

1. Develop a library management system to add, delete, and search for books efficiently.
2. Develop an ATM system to check balance, deposit money, and withdraw funds.
3. Develop a C program to calculate salary increments using a lookup table which stores the percentage of increment based on the current salary.
4. Develop a voting system where users can vote for candidates and view results.
5. Develop a basic calculator for arithmetic operations like addition, subtraction, multiplication, and division.
6. Develop a contact management system to store and manage details like name, phone number, and email.
7. Develop a banking system supporting multiple users for account management and transactions.
8. Develop a C program to calculate SGPA and CGPA based on students' marks across semesters.
9. Develop a registration page in C using file handling to securely store usernames and passwords.
10. Develop an encryption and decryption algorithm to securely transform and restore data by using the GNU C Library: crypt.

Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", 2nd Edition, 2015, Pearson Education India, ISBN: 978-93-3254-944-9.
2. Yashavant P. Kanetkar, "Let Us C", 16th Edition, 2019, BPB Publications, ISBN: 978- 93-8728-449-4.
3. E. Balaguruswamy, "Programming in ANSI C", 8th Edition, 2019, McGraw Hill Education, ISBN: 978-93-5316-513-0.
4. Pradip Dey, Manas Ghosh, "Programming in C", 2nd Edition, 2018, Oxford University Press, ISBN: 978-01-9949-147-6.
5. N.B. Venkateswarulu, "C programming", 1st Edition, S.Chand Publishing, 2017, ISBN: 978-93-525-3356-5.
6. Jacqueline A Jones and Keith Harrow, "Problem Solving with C", Pearson Education. ISBN: 978-93-325-3800-9.

Web References (e-Resources):

1. https://nptel.ac.in/courses/106105171
2. https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/pages/lecture-notes/
3. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013843237039374336345 17_shared/overview
4. https://cse02-iiith.vlabs.ac.in/List%20of%20experiments.html

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Annexure-I

Python Programming
I Year B. Tech. II semester
(Common to CSE, CSE (AI&ML), IT Branches)

Course Code:	L	T	P	C
	4	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to:	
C01:	**Understand** the historical development, necessity, applications, and basic concepts of python programming
C02:	**Identify** and implement appropriate control structures to solve a particular programming problem
C03:	**Examine** various data structures and apply to solve real world problems.
C04:	**Build** simple functions and packages used in python for solving real world problems.
C05:	**Outline** Object Oriented concepts in python and illustrate Exception handling

UNIT-I	**8 Lectures**
Introduction: History of Python, Need of Python Programming, Applications of Python, Variables, Assignment, Comments, Keywords, Data types, Input-Output, Indentation.	
TextBook-1: Chapter 3 (S-3.1 – S-3.12)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Understand the Evolution of Python [L2] 2. Recall the Need and Applications of Python [L1] 3. Outline python's Input and Output Functions[L2]	

UNIT-II	**10 Lectures**
Operators and Expressions: Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations **Control Flow-** if, if-elif-else, for, while, break, continue, pass	
TextBook-1: Chapter 3 (S-3.12), Chapter 4 (S-4.1 – S-4.7)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Illustrate python operators: arithmetic, comparison, assignment, logical, bitwise, membership, identity [L2] 2. Make use of control flow statements: if, if-elif-else, for, while, break, continue, pass. [L3]	

UNIT-III	**12 Lectures**
Data Structures: Strings, Lists, Tuples, Sets, Dictionaries. Data Structures manipulations - create, Index, Negative indexing, Slicing, update, add elements, delete or remove elements, operations, Comprehension, Membership Test, Iteration.	
TextBook-1: Chapter 6 (S-6.1 – S-6.9), Chapter 8 (S-8.1 – S-8.6)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Understanding basic operations on lists, including indexing and slicing [L2] 2. Utilize methods of lists, tuples, sets, and dictionaries to solve problems [L3] 3. Compare and apply appropriate use cases for lists, tuples, sets, and dictionaries. [L2]	

UNIT-IV	**10 Lectures**
Functions - Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Lambda Functions, Function Returning Values, Built-in functions, Scope of the Variables in a Function - Global and Local Variables.	

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Modules: Creating modules, import statement, from…import statement, namespaces. **Python packages:** Introduction to PIP, Installing Packages via PIP
TextBook-1: Chapter 5 (S-5.1 – S-5.8,5.12)
Learning Outcomes:
At the end of the unit, the student will be able to
1. Understanding and implementing various types of function arguments and scopes in Python. [L2] 2. Utilize Python modules to understanding the import mechanisms [L3]

UNIT-V	**11 Lectures**
Object Oriented Programming (OOP) in Python: Classes and Objects, Class Method and self Argument, The __init__() Method (The Class Constructor), Class Variables and Object Variables, Public and Private Data Members, Inheritance, Overriding Methods. **Error and Exceptions:** Introduction to Errors and Exceptions, Handling Exception, try except block, finally block, Raising Exceptions. **File Handling**: Type of files, Opening and Closing files, Reading and Writing files.	
TextBook-1: Chapter 9 (S-9.1 – S-9.8), Chapter 10 (S-10.1 – S-10.3) TextBook-1: Chapter 7 (S-7.1 – S-7.5), Chapter 12 (S-12.1 – S-12.10)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Understand and implement classes, methods, and the 'self' variable in Python [L2] 2. Demonstrate concepts of inheritance, method overriding, and data hiding in OOP [L2] 3. List the differences between errors and exceptions, and handle exceptions using try-except blocks [L1] 4. Illustrate file operations including reading, writing, and manipulating file pointers in Python. [L2]	

Text Books:
1. Reema Thareja, "Python Programming: Using Problems Solving Approach", Oxford University Press, 2017 2. Fundamentals of Python First Programs, Kenneth. A. Lambert, Cengage.
Reference Books:
1. Fundamentals of Data Structures using Python, P Lalitha Surya Kumari, P. S. Avadhani, Lambert Academic Publishing 2. Introduction to Python Programming, Gowrishankar.S, Veena A, CRC Press. 3. Introduction to Programming Using Python, Y. Daniel Liang, Pearson.
Web References:
1. https://www.tutorialspoint.com/python3/python_tutorial.pdf 2. https://www.python.org/doc/

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Annexure-II

Fundamentals of Computers
I Year B. Tech. I semester
(Common to CSE, CSE (AI&ML), IT Branches)

Course Code:	L	T	P	C
	4	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to:	
C01:	Identify different I/O devices and their usage.
C02:	Compare different computer memory with their efficiency.
C03:	Relate different computer software's and programming languages for solving problems.
C04:	Summarize the use of operating system, database system, and computer network in the field of computing in engineering.
C05:	Infer the methods and applications of artificial intelligence (AI), machine learning (ML) and data science.

UNIT-I **10 Lectures**

Introduction to computers: Computers, Stored Program Concept, Classification of Computers, Evolution and Development of Computers, Application Areas of Computers, Features/Characteristics of Computers, Basic Organization of a Computer.

Input and Output Devices: Input Devices, Output Devices, Soft Copy Devices, Hard Copy Devices, Voice Response Systems, Biometric Devices

TextBook-1: Chapter 1 (S-1.1 – S-1.7)
https://oer-studentresources.gesci.org/wp-content/courses/Computer/CS-F1-Introduction-to-computers/evolution_and_development_of_computers.html (Development of Computers)
TextBook-1: Chapter 2 (S-2.1 – S-2.6)

Learning Outcomes:

At the end of the unit, the student will be able to

1. Outline characteristics and classification of computers (L2)
2. Demonstrate different configurations of software and hardware used in computer (L2)
3. Model the computer by organizing different computer peripherals such as I/O, CPU, etc. (L3)

UNIT-II **10 Lectures**

Computer Memory: Introduction, Memory Organization, Memory Hierarchy, Sequential and Random Access, Processor Registers, Cache Memory, Primary Memory,Secondary Storage Devices, Magnetic Tapes, Floppy Disks, Hard Disks, External Hard Disks, Optical Disks, USB Flash Drives, Memory Cards, Mass Storage Devices.

TextBook-1: Chapter 3 (S-3.1 – S-3.16)

Learning Outcomes:

At the end of the unit, the student will be able to

1. Summarize computer memory hierarchy. (L2)
2. Classify different memory w.r.t. speed and cost. (L2)
3. Illustrate different external storage devices and its applications. (L2)

UNIT-III **10 Lectures**

Computer Software: Introduction to Computer Software, Classification of Computer Software, System Software, Application software, Graphics Software, Multimedia Software, Database Management Software, Firmware, Middleware, Procuring Computer Software.

Problem Solving Using Computers: Introduction, Program Development Life Cycle, Program Design Tools, Programming Languages, Generations of Programming Languages, Categorization of High-level Languages, Some Popular High-level Languages, Apps.

TextBook-1: Chapter 6 (S-6.1 – S-6.7)
TextBook-1: Chapter 7 (S-7.1 – S-7.7)
https://www.builder.ai/glossary/app#:~:text=An%20app%20is%20a%20type,enhance%20productivity%20and%20streamline%20communication (Apps)

Learning Outcomes:

At the end of the unit, the student will be able to

1. Compare different computer software's (L2)
2. Summarize different programming languages for solving problems. (L2)
3. Contrast Structured Programming Language, Logic-oriented Programming Language, and

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Object-oriented Programming. (L2)
UNIT-IV **12 Lectures**
Fundamental Operating Systems: Introduction, History of Operating Systems, Functions of Operating Systems, Types of Operating Systems, Providing User Interface, Popular Operating Systems **Database Systems:** File-Oriented Approach, Database-oriented Approach, Database Views, Three-schema Architecture, Database Models, Components of Database Management, Retrieving Data Through Queries. **Computer Networks:** Introduction to Computer Networks, Types of Networks, Physical Components of a Network, Wired Media, Wireless Media, Networking Devices, Network Topologies, Wireless Networks.
TextBook-2: Chapter 11 (S-11.1 / P-238 – S-11.11 / P-258) TextBook-1: Chapter 9 (S-9.1 – S-9.7), Chapter 10 (S-10.1 – S-10.8)
Learning Outcomes:
At the end of the unit, the student will be able to
1. Explain fundamentals of operating systems. (L2) 2. Illustrate database system applications and its design concepts. (L2) 3. Outline fundamentals of computer networks and its applications. (L2)
UNIT-V **8 Lectures**
Introduction to Artificial Intelligence & Machine Learning (AI&ML) and Data Science: Introduction to AI & ML, and Data Science, Use Cases in Business and Scope, Modelling Concepts, CRISP-DM Method
1. https://community.aws/content/2drbbXokwrIXivItJ8ZeCk3gT5F/introduction-to-artificial-intelligence-and-machine-learning?lang=en **(Artificial Intelligence)** 2. https://www.javatpoint.com/machine-learning-models **(Machine Learning)** 3. https://www.techtarget.com/searchenterpriseai/feature/Top-12-machine-learning-use-cases-and-business-applications **(Machine Learning)** 4. https://www.heavy.ai/learn/data-science **(Data Science)** 5. https://www.sv-europe.com/crisp-dm-methodology/ **(CRISP-DM Method)**
Learning Outcomes:
At the end of the unit, the student will be able to
1. Outline the main methods and applications of artificial intelligence (AI) concepts. (L2) 2. Outline the main methods and applications of machine learning (ML) concepts. (L2) 3. Outline the main methods and applications of data science concepts. (L2)
Text Books:
1. Reema Thareja, Fundamentals of Computers, Second Edition, Oxford University Press, 2019. 2. E Balagurusamy, Fundamentals of Computers, Tata McGraw Hill Education Private Limited, 2009
Reference Books:
1. Raghu Ramakrishnan, Johannes Gehrke, Database Management Systems, 4th Edition, McGraw-Hill, 2002. 2. Andrew S. Tanenbaum, Modern Operating Systems, 2nd edition, PHI, 1995.
Web References:
1. https://oer-studentresources.gesci.org/wp-content/courses/Computer/CS-F1-Introduction-to-computers/evolution_and_development_of_computers.html (Development of Computers) 2. https://www.builder.ai/glossary/app#:~:text=An%20app%20is%20a%20type,enhance%20productivity%20and%20streamline%20communication (Apps) 3. https://www.geeksforgeeks.org/what-is-an-operating-system/ (Operating System) 4. https://www.javatpoint.com/computer-network-tutorial (Computer Network) 5. https://community.aws/content/2drbbXokwrIXivItJ8ZeCk3gT5F/introduction-to-artificial-intelligence-and-machine-learning?lang=en **(Artificial Intelligence)** 6. https://www.javatpoint.com/machine-learning-models **(Machine Learning)** 7. https://www.techtarget.com/searchenterpriseai/feature/Top-12-machine-learning-use-cases-and-business-applications **(Machine Learning)** 8. https://www.heavy.ai/learn/data-science **(Data Science)** 9. https://www.sv-europe.com/crisp-dm-methodology/ **(CRISP-DM Method)**

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Annexure-III

Python Programming Lab
I Year B. Tech. II semester
(Common to CSE, CSE (AI&ML), IT Branches)

Course Code:

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to:		**Module No.**
C01:	Understand core programming basics and various Operators of Python	1,2
C02:	Implement programs using conditional statements and loops and strings.	3,4
C03:	Develop functions and strings to perform simple tasks.	5,6
C04:	Make use of various data structures like lists, tuples, sets and dictionaries.	7,8,9
C05:	Implement Python programs with files, Classes and objects	10,11

Module-1: Basics of Python

a) Write a program to display the statements.
b) Demonstrate about fundamental Data types in Python Programming. (i.e., int, float, complex, bool and string types)
c) Write a Python program to demonstrate various type conversion functions.
d) Write a program to demonstrate the inbuilt Math function

Module-2: Operators in Python

a) Demonstrate the following Operators in Python with suitable examples.
i) Arithmetic Operators ii) Relational Operators iii) Assignment Operators iv) Logical Operators v) Bit wise Operators vi) Ternary Operator vii) Membership Operators viii) Identity Operators

Module-3: Conditional Branching Statements

a) Write a program to check whether the given number is even or odd
b) Write a program to read marks of a student and display the corresponding grade
c) Write a program to find the largest element among the given numbers (multi-way if-elif-else statements.)

Module-4: Looping/Iterative Statements

a) Implement the following programs using while loop and for loop
i. Display all prime numbers up to n.
ii. Print the nth multiplication table.
iii. Print different patterns using loops:
b) Demonstrate the following control transfer statements in Python with suitable examples.
i. break ii. continue iii. Pass

Module-5: Functions

a) Write a function to find the multiplication of two numbers and demonstrate the usage of parameters and arguments of a function.
b) Write a program to define a function using default arguments.
c) Demonstrate lambda functions in Python with suitable example programs.

Module-6: Strings

a) Write a program to manage and analyse customer feedback using string operations include:
i. Create feedback with name, email, comment
ii. Collecting feedback.
iii. Normalizing feedback (e.g., removing extra spaces, converting to lowercase).
iv. Extracting key in formation (e.g., names, email addresses, and comments).

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v. Searching for keywords.
vi. Replacing certain words.
vii. Formatting feedback for display.
viii. Summarizing feedback.

Module-7: Lists:

a) Write a program to create a list and perform the following operations:
   i. + ii. * iii. slicing iv. del
b) Inventory Management: You have a list of items in your warehouse along with their quantities. Write a program to find out which items are low in stock (quantity less than 10). (use only comprehensions)
c) Employee Performance: You have a list of employee names and their corresponding performance scores. Write a program to sort the list based on the performance scores in descending order.
d) Sales Analysis: you have a list of sales figures for the past week. Write a program to find the total sales, the highest sale, the lowest sale, and the average sale.
e) Write a program to calculate the length of each element in a list using map function in python.

Module-8: Tuples

a) Write a program to return the top n's most frequently occurring chars and their respective counts. e.g. string=aaaaaabbbbcccc, n=2 should return [(a 6) (b 4)].
b) Write a program to create n iterables of varied sizes and group the values using zip function in python.
c) Student Information: Write a program to create a list of tuples where each tuple contains the student ID, name, and grade and find the student with the highest grade.
d) Course Enrolment: Write a program to create list of tuples where each tuple contains the course ID and the number of students enrolled and find the total number of students enrolled across all courses
e) Faculty Information: Write a program to create a list of tuples where each tuple contains the faculty ID, name, and department and find all faculty members in a given department.
f) Library Book Tracking: You have a list of tuples where each tuple contains the book ID, title, and number of copies available. Write a program to find all books with fewer than 5 copies available.

Module-9: Sets & Dictionaries

a) Write a program to create two sets and perform the following operations:
   i. Union ii. Intersection iii. Difference iv. Asymmetric Difference
b) Write a program to generate a dictionary that contains numbers (between 1 and n) in the form of (x,x*x).
c) Write a program to implement a shopping cart where you can add items with their prices and quantities, and then calculate the total cost.
d) Banking System: Write a program to create dictionary with customer name and balance and Retrieve the balance for a given customer, Deposit a specified amount into a customer's account, Withdraw a specified amount from a customer's account if sufficient balance is available, Transfer a specified amount from one customer's account to another's and Remove a customer from the bank's system.

Module-10: Classes and objects

a) Create a class to represent menu items in a restaurant with attributes like name, price, and category. Implement methods to display menu details and calculate the total cost of a selected list of items.

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b) Write a program to read 3 subject marks and display pass or failed using class and object.

Module-11: Files

a) Write a program to copy the contents of a file to another file.

b) Write a program to compute the number of characters, words and lines in a file.

Case Study:

Select any one application mentioned below

Note: A report has to be submitted by every student at the end of the semester that includes design, coding, output, etc.

1. Design a Python program to manage inventory, process orders, and handle customer information for an online store.
2. Create a library system to track books, manage member accounts, and handle book loans and returns.
3. Implement a personal finance management tool to track income, expenses, and generate monthly reports.
4. Create a system to manage student grades, calculate GPAs, and generate academic reports.
5. Develop a Python-based movie recommendation system using collaborative filtering.
6. Build a to-do list application that allows users to add, update, delete, and prioritize tasks..
7. Build a patient management system to handle appointments, medical records, and billing.
8. Design a digital menu for a restaurant with options for ordering, bill generation, and inventory management.
9. Implement a fitness tracking application to log workouts, track progress, and suggest exercise plans.
10. Build a secure online voting platform with user authentication and vote tallying.
11. Create a program to manage recipes, including ingredients, instructions, and nutritional information.
12. Build a travel planning application to manage itineraries, bookings, and budget tracking.
13. Develop an e-learning application with course creation, student enrolment, and progress tracking.
14. Build a car rental management system to handle bookings, returns, and vehicle maintenance.
15. Build a budget planning application to track expenses, income, and financial goals.
16. Develop a cryptocurrency tracking application to monitor prices, market trends, and portfolio performance.

Reference Books:

1. Python Programming: Using Problem Solving Approach by Reema Theraja , Oxford publications
2. Ashok N Kamthane, Amit Ashok Kamthane, *Programming and Problem Solving with Python*, 1st Edition, McGraw Hill Education (India), 2018.

Web References:

1. https://www.python.org/doc/
2. https://www.w3schools.com/python/python_reference.asp
3. https://thepythonguru.com/
4. https://www.programiz.com/python-programming

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Annexure-IV

Computer Engineering Workshop
I Year B. Tech. I semester
(Common to CSE, CSE (AI&ML), IT Branches)

Course Code:	L	T	P	C
	0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to:		Module No.
C01:	Identify the peripherals of a computer.	1
C02:	Demonstrate the installation process of operating systems like MS Windows, LINUX.	2
C03:	Make use of MS-Office suite that comprises of various applications to create documents, organizes & analyses data and captivating presentations.	3
C04:	Categorize various UNIX/LINUX Commands to work on a modern operating system	4
C05:	Experiment with GIT Commands and make use of LaTeX to prepare research articles.	5

Module-1: Hardware Concepts

1. Identify the peripherals of a computer, components in a CPU and its functions.
2. Draw the block diagram of the CPU along with the configuration of each peripheral.
3. Disassemble and assemble the PC back to working condition.

Module-2: Software Installations

1. Install operating systems like LINUX and MS windows on a personal computer.
2. The system should be configured as dual boot with both MS windows and LINUX.

Module-3: Office Suite

1. Creating Documents: Formatting Fonts/Texts, page layout, Applying Text effects, Character Spacing, Borders and Colours, Inserting Header and Footer, equation editor.
2. Spreadsheet Orientation: Accessing, overview of toolbars, saving spreadsheet files, Using help and resources. Creating a Scheduler, Gridlines, Format Cells, Summation, auto fill, Formatting Text, Renaming and Inserting worksheets, Hyper linking.
3. Excel Calculation: Calculating Average, Cell Referencing, Excel Formula, std. deviation, Charts, Count Function, Sorting, Conditional formatting, Excel Advanced-sumif, VLOOKUP, and Pivot Table.
4. Creating Power Point: Student should work on basic power point utilities and tools to create basic power point presentation. PPT Orientation, Slide Layouts, Inserting Text, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting Images, Tables and charts.
5. Software as a service (SaaS): Usage of online office suite.

Module-4: UNIX/LINUX Commands

1. Study and practice on file system, handling files with commands, syntax, usage, application.
2. Practice on vi editor.
3. Study and practice on shells/shell programming with relevant programming constructs, syntax, usage, application.

Module-5: GIT Commands and LaTeX

1. Installation of GIT, Branch in Git Basic GIT Commands.
2. Installation of LaTeX and preparing research articles by creating overleaf account.
3. Introduction to Scratch Programming - Introduction, Stage, Sprite, Script, Block Palette.

Reference Books:

1. IT Essentials: PC Hardware and Software Companion Guide, Third Edition, David Anfinson, Ken Quamme.
2. UNIX concepts and applications by Sumitabha Das, TMH Publications.
3. Shell programming by Yashwanth Kanetkar.

Web References:

1. https://www.javatpoint.com/

Annexure-V

Problem solving using C
I Year B. Tech. I semester
(Common to CSE, CSE (AI&ML), IT, ECE, and EEE (I-II) Branches)

Course Code:	L	T	P	C
	4	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
C01:	Explain the basic constructs of C through the use of simple applications.
C02:	Demonstrate the utilization of arrays and strings in the development of C programs.
C03:	Utilize functions and pointers to construct various applications in C.
C04:	Apply concepts of structures and unions to build and implement C applications.
C05:	Develop applications using sequential and random-access file processing techniques.

UNIT-I	10 Lectures
Introduction to C: Basic structure of C program, Constants, Variables and data types, Operators and Expressions, Arithmetic Precedence and associativity, Type Conversions. Managing Input and Output Operations Formatted Input, Formatted Output.	
TextBook-1: Chapter 2 (S-2.1 – S-2.12)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Outline the Basic Structure and Components of C Programs. (L2) 2. Demonstrate Variables, Data Types, Operators, and Expressions. (L2) 3. Illustrate Input and Output Operations. (L2)	

UNIT-II	12 Lectures
Decision Making, Branching, Looping: Decision making with if statement, Simple if statement, The if...else statement, Nesting of if...else statement, the else... if ladder, switch statement, the (? :) operator, the goto statement, The while statement, the do statement, the for statement, Jumps in Loops. **Arrays & Strings:** One, Two-dimensional Arrays, multi-dimensional Arrays, Character Arrays. Declaration and Initialization of Strings, reading and writing of strings, string handling functions.	
TextBook-1: Chapter 3 (S-3.1 – S-3.8), TextBook-2:Chapter 13,14,15,16(PP:215-283)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Classify Decision Making and Branching (L2) 2. Interpretation of Looping Constructs (L2) 3. Summarize Arrays and Strings (L2)	

UNIT-III	10 Lectures
Function and Dynamic Memory Allocation: Functions: Designing structured programs, declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, passing arrays to functions, recursion. Introduction to Pointers, Pointer Arithmetic, Pointers for Inter-Function Communication, passing pointers to functions, call by reference, Dynamic Memory Allocation.	
TextBook-1: Chapter 4 (S-4.1 – S-4.11), Chapter 5 (S-5.1 – S-5.12)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Utilize Functions (Understand and Implement Functions, Utilize Various Function Types, Advanced Function Techniques) (L3) 2. Experiment with Pointers (Basic Pointer Operations, Pointers and Data Structures) (L3) 3. Explain Advanced Pointer Usage (Pointers in Functions, Pointers to Complex Data Types) (L2)	

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UNIT-IV	10 Lectures
Structure and Unions: Defining a structure and union, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, arrays of structures, arrays within structures, structures within structures, definition and usage of union, structures and unions using functions, size of structures and bit-fields. The Type Definition (Type def), Enumerated Types.	
TextBook-1: Chapter 6 (S-6.1 – S-6.9)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Define Structures and Build C programs using Structures. (L3) 2. Explain Complex Data Structures. (L2) 3. Explain Unions and Bit-Fields. (L2)	

UNIT-V	8 Lectures
File handling: Introduction to Files, Modes of File operations, Text and Binary Files, Defining and opening a file, closing a file, Input/ Output operations on files, Error handling during I/O operations, random access to files and Command Line Arguments, user defined header files.	
TextBook-2: Chapter 19 (PP:325-348)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Outline File Operations. (L2) 2. Summarize Error Handling and Random Access. (L2) 3. Utilize Command Line Arguments. (L3)	

Text Books:

1. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", 2nd Edition, 2015, Pearson Education India, ISBN: 978-93-3254-944-9.
2. Yashavant P. Kanetkar, "Let Us C", 16th Edition, 2019, BPB Publications, ISBN: 978-93-8728-449-4.

Reference Books:

1. N. B. Venkateswarlu, E. V. Prasad, "C and Data Structures", 1st Edition, S. Chand Publishing, 2010, ISBN: 978-93-525-3356-5.
2. Pradip Dey, Manas Ghosh, "Programming in C", 2nd Edition, 2018, Oxford University Press, ISBN: 978-01-9949-147-6.
3. Jacqueline A. Jones and Keith Harrow, "Problem Solving with C", Pearson Education. ISBN: 978-93-325-3800-9.
4. E. Balagurusamy, "Programming in ANSI C", 8th Edition, 2019, McGraw Hill Education, ISBN: 978-93-5316-513-0.

Web References (e-Resources):

1. https://nptel.ac.in/courses/106105171
2. https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/pages/lecture-notes/
3. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013843237039374336345 17_shared/overview
4. https://cse02-iiith.vlabs.ac.in/List%20of%20experiments.html

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Annexure-VI

Web Technologies Fundamentals lab
I Year B. Tech. II semester
(Common to CSE, CSE (AI&ML), IT Branches)

Course Code:	L	T	P	C
	0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to		Module No.
C01:	**Develop** professional web pages for an application using HTML elements like lists, navigations, tables, various form elements, and embedded media, including images, audio, and video.	1,2
C02:	**Build** inline, internal, and external CSS to enhance the visual presentation of web pages, including layout, fonts, colors, and backgrounds.	3,4
C03:	**Utilize** JavaScript to develop interactive HTML web pages and validate form data.	5,6,7
C04:	**Apply** JavaScript functions and events to enhance user interaction and provide a dynamic user experience.	8,9
C05:	**Experiment with** XML files to store and display structured data and write a DTD to perform well-formed and validated XML documents.	10

Module-1:
Design a web page using Basic HTML Elements – Structure of HTML, Headings, Paragraph, Division and Span, List, Link, Image, Table, Form, Input, Iframe, and Media Elements.

Module-2:
Design the following static web pages required for an online book store website.

(a) HOME PAGE:
i) The static home page must contain three frames.
Top frame: Logo and the college name and links to the Home page, Login page, Registration page, Catalogue page, and Cart page (the description of these pages will be given below). Left frame: At least four links for navigation, which will display the catalogue of respective links. For e.g.: When you click the link "CSE" the catalogue for CSE Books should be displayed in the Right frame. Right frame: The pages to the links in the left frame must be loaded here. Initially, this page contains a description of the website.
ii) Add media content in a frame using audio, video, and iframe elements to the Home page of an online book store website. The page should include:
1) Audio Element: An audio player to play background music or a podcast.
2) Video Element: A video player to display a promotional video about the book store.
3) Iframe Element: An iframe to embed a Google Maps location of the book store.

(b) LOGIN PAGE

(c) CATALOGUE PAGE: The catalogue page should contain the details of all the books available on the website in a table: The details should contain the following:
i) Snapshot of Cover Page. ii)Author Name. iii)Publisher.
iv) Price. v)Add to cart button.

(d) REGISTRATION PAGE: Create a "registration form "with the following fields
i) Username: Text input field
ii) Password: Password input field
iii) Email: Email input field
iv) Phone number: Text input field
v) Birthday: Date picker
vi) Favorite Color: Color picker
vii) Gender: Select an element with options (Male, Female, Other).

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Module-3:
Develop and demonstrate the usage of inline, internal, and external style sheets using CSS.

Module-4:
Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the properties of the font of the capital (colour, bold, and font size).

Module-5:
Develop and demonstrate JavaScript with POP-UP boxes and functions for the following problems:

a) Input: Click on the Display Date button using onclick( ) function
   Output: Display the date in the textbox.
b) Input: A number n obtained using prompt
   Output: Factorial of n number using alert.
c) Input: A number n obtained using prompt
   Output: A multiplication table of numbers from 1 to 10 of n using alert.
d) Input: A number n obtained using prompt and add another number using confirm
   Output: Sum of the entire n numbers using alert.

Module-6:
Write JavaScript to validate the following fields of the Registration page.

(a) First Name (Name should contain alphabets and the length should not be less than 6 characters).
(b) Password (Password should not be less than 6 characters in length).
(c) E-mail ID (should not contain any invalid and must follow the standard pattern name@domain.com)
(d) Mobile Number (The phone number should contain 10 digits only).
(e) Last Name and Address (should not be Empty).

Module-7:
Write an HTML page including any required JavaScript that takes a number from the text field in the range of 0 to 999 and shows it in words. It should not accept four and above digits, alphabets, and special characters.

Module-8:
Create an 'Employee' class extending from a base class 'Person'. The task should include:

(a) Create a class 'Person' with attributes 'name' and 'age', and add a constructor to initialize these values.
(b) Create a class 'Employee' that extends 'Person' and includes an additional attribute 'role,' with a constructor to initialize 'name,' 'age,' and 'role.'

Module-9:
Create an array of objects representing book details in an online book store. Each object should include the book title, author, genre, and price. Render the details of the books on the page using this array, demonstrating array creation, accessing array elements, and applying array methods.

Module-10:
Write an XML file which will display the Book information which includes the following:

a) Title of the Book b)Author Name c)ISBN Name
d)Publisher Name e)Edition f)Price

Write a Document Type Definition(DTD) to validate the above XML file.

Case Study:
Select any one practical applications mentioned below.
Note: A report has to be submitted by every student at the end of the semester, including design, coding, output, etc.

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1. **Portfolio Website:** Create a personal portfolio website showcasing projects, skills, and experience using HTML, CSS, and JavaScript for interactive features.
2. **Responsive Blog:** Design a responsive blog template with multiple pages, utilizing HTML for structure, CSS for styling, and JavaScript for dynamic content.
3. **E-commerce Site:** Develop a basic e-commerce website with product listings, shopping cart functionality, and user authentication using HTML, CSS, and JavaScript.
4. **Quiz Game:** Create an interactive quiz game with multiple-choice questions, scoring, and feedback using HTML, CSS, and JavaScript for functionality.
5. **To-Do List:** Develop a to-do list application allowing users to add, edit, and delete tasks, with data persistence using JavaScript local storage.
6. **Interactive Resume:** Design a dynamic resume with sections for education, experience, and skills, including interactive elements powered by JavaScript.
7. **Photo Gallery:** Create an interactive photo gallery with image lightbox effects, using CSS for styling and JavaScript for functionality.
8. **Recipe Finder:** Build a recipe search application that fetches and displays recipes from an API, using JavaScript for dynamic content updates.
9. **Expense Tracker:** Develop an expense tracker app to log and categorize expenses, with data visualization using charts and graphs created with JavaScript.
10. **Event Countdown:** Create a countdown timer for upcoming events with HTML structure, CSS styling, and JavaScript for the timer logic.
11. **Contact Form:** Create a contact form with validation and submission handling using JavaScript, styled with CSS to match the site's theme.
12. **Memory Game:** Develop a memory matching game with cards that flip and match, using CSS for design and JavaScript for game logic.
13. **Interactive Story:** Design an interactive storytelling website where users make choices that affect the narrative, using JavaScript for decision logic.
14. **Fitness Tracker:** Build a fitness tracker to log workouts and track progress, with dynamic charts and data visualization using JavaScript.
15. **Task Manager:** Create a task manager application with features for adding, editing, and prioritizing tasks, using JavaScript for interactivity.
16. **Interactive Timelines:** Design interactive timelines to visualize historical events or project milestones, using HTML, CSS, and JavaScript.
17. **Product Landing Page:** Develop a product landing page with animations and interactive elements, using CSS for styling and JavaScript for effects.
18. **Calculator:** Build a fully functional calculator with basic arithmetic operations, using JavaScript for logic and CSS for design.
19. **Job Board:** Develop a job board where users can post and search for jobs, with dynamic content updates using JavaScript.
20. **Interactive Form:** Create a multi-step interactive form with validation and progress indicators, using JavaScript for form handling and CSS for styling.

References:

1. Internet and Web Technologies by Raj Kamal, Tata McGraw-Hill.
2. Programming the World Wide Web by Robert W. Sebesta, Pearson Education.
3. An Introduction to Web Design and Programming by Paul S Wang, Sanda S Katila, 1st Edition, Cengage Learning.

Web Links:

1. https://onlinecourses.swayam2.ac.in/nou24_cs18/preview
2. https://infyspringboard.onwingspan.com/en/app/toc/lex_17739732834840810000_shared/overview (HTML5)
3. https://infyspringboard.onwingspan.com/en/app/toc/lex_18109698366332810000_shared/overview (Javascript)

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Annexure-VII

Problem Solving using C Lab
I Year B. Tech. I semester
(Common to CSE, CSE (AI&ML), IT, ECE, and EEE (I-II) Branches)

Course Code:

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to:		**Module No.**
C01:	Outline the use of basic constructs of C for simple applications.	**1,2,3**
C02:	Develop C programs for simple applications using Arrays and Strings.	**4**
C03:	Illustrate concepts such as functions, recursion, and pointers with suitable examples.	**5,6,7**
C04:	Build C programs involving Structures and Unions.	**8**
C05:	Develop applications using sequential and random-access file processing.	**9**

Module-1: I/O and Data Types

1. Write a C program to demonstrate Format Specifiers and Input/Output Statements.
2. Write a C program to demonstrate various Data Types.

Module-2: Operators and Expressions

1. Write a C program to demonstrate various Operators including Bitwise Operator.
2. Write a C program to demonstrate Arithmetic Expressions and Type Casting.

Module-3: Control Statements

1. Write a C program to demonstrate decision making statements.
2. Write a C program to demonstrate iterative statements.
3. Write a C program to demonstrate break and continue Statement.

Module-4: Arrays

1. Write a C program to demonstrate arrays (one-dimensional and two-dimensional).
2. Write a C program to demonstrate string handling functions using built-in and user defined functions.

Module-5: Functions

1. Write a C program to demonstrate user defined functions.
2. Write a C program to demonstrate nested functions.

Module-6: Pointers

1. Write a C program to demonstrate arithmetic expressions using pointers.
2. Write a C program to demonstrate Pointers to Arrays.
3. Write a C program to demonstrate manipulate strings using pointers.
4. Write a C program to demonstrate dynamic memory allocation.

Module-7: Advanced Pointers

1. Write a C program to demonstrate Call-by-value, Call-by-reference.
2. Write a C program to demonstrate recursive function.
3. Write a C program to demonstrate Functions with Storage Classes (Static).

Module-8: Structures

1. Write a C program to demonstrate structures.
2. Write a C program to demonstrate structures within structures.
3. Write a C program to demonstrate pointer to a structure.
4. Write a C program to demonstrate unions.

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Module-9: Files

1. Write a C program to demonstrate I/O operations on files.
2. Write a C program to demonstrate concatenating two files.
3. Write a C program to demonstrate copy content of one file to another file.

Case Study:

Select any one application mentioned below.

Note: A report has to be submitted by every student at the end of the semester that includes design, coding, output, etc.

1. Develop a library management system to add, delete, and search for books efficiently.
2. Develop an ATM system to check balance, deposit money, and withdraw funds.
3. Develop a C program to calculate salary increments using a lookup table which stores the percentage of increment based on the current salary.
4. Develop a voting system where users can vote for candidates and view results.
5. Develop a basic calculator for arithmetic operations like addition, subtraction, multiplication, and division.
6. Develop a contact management system to store and manage details like name, phone number, and email.
7. Develop a banking system supporting multiple users for account management and transactions.
8. Develop a C program to calculate SGPA and CGPA based on students' marks across semesters.
9. Develop a registration page in C using file handling to securely store usernames and passwords.
10. Develop an encryption and decryption algorithm to securely transform and restore data by using the GNU C Library: crypt.

Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", 2nd Edition, 2015, Pearson Education India, ISBN: 978-93-3254-944-9.
2. Yashavant P. Kanetkar, "Let Us C", 16th Edition, 2019, BPB Publications, ISBN: 978- 93-8728-449-4.
3. E. Balaguruswamy, "Programming in ANSI C", 8th Edition, 2019, McGraw Hill Education, ISBN: 978-93-5316-513-0.
4. Pradip Dey, Manas Ghosh, "Programming in C", 2nd Edition, 2018, Oxford University Press, ISBN: 978-01-9949-147-6.
5. N.B. Venkateswarulu, "C programming", 1st Edition, S.Chand Publishing, 2017, ISBN: 978-93-525-3356-5.
6. Jacqueline A Jones and Keith Harrow, "Problem Solving with C", Pearson Education. ISBN: 978-93-325-3800-9.

Web References (e-Resources):

1. https://nptel.ac.in/courses/106105171
2. https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/pages/lecture-notes/
3. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013843237039374336345 17_shared/overview
4. https://cse02-iiith.vlabs.ac.in/List%20of%20experiments.html

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ANNEXURE - I

ELECTRONIC DEVICES AND CIRCUITS
I Year B. Tech I semester
(Branch: ECE)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Outline the concepts of basic semiconductor devices(L2)
CO2:	Understand the characteristics of different semiconductor diodes and their applications(L2)
CO3:	Analyse the operation of BJT under different biasing methods(L4)
CO4:	Analyse BJT amplifier circuits with small signal low frequency model(L4)
CO5:	Understand the construction and working of FET(L2)

UNIT-I	12 Lectures
Energy band theory of solids and transport phenomenon in semiconductors: Energy Band Theory of Solids, Insulators, Semiconductors, Metals, Intrinsic and Extrinsic Semiconductors, donor and acceptor impurities, band diagrams, mass action law, intrinsic carrier concentration, continuity equation, Hall effect, Carrier Mobility, Conductivity, Drift and Diffusion currents. Band structure of PN Junction, PN diode biasing, diode current equation, Volt – Amp. Characteristics, Temperature Dependence, Transition and Diffusion Capacitance of PN Junction.	
Textbook 1: Chapter -1 Section 1.5 - 1.8 Textbook 1: Chapter- 2 Section 2.1 - 2.3 & 2.6 – 2.10 Textbook 1: Chapter -19 Section 19.5 Textbook 1: Chapter -3 Section 3.1 - 3.9 Textbook 1: Chapter -19 Section 19.10	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1.Explain the energy band theory of solids (insulators, semiconductors, and metals) based on their band structures(L2) 2.Describe the transport phenomena in semiconductors.(L2) 3.Understand the band structure representation of PN junction, interpret the Volt-Ampere characteristics along with the temperature effects.(L2)	

UNIT-II	12 Lectures
Rectifiers and special diodes: Half-wave, Full-wave, and Bridge Rectifiers with and without Filters: Series inductor filter and shunt capacitor filter, Ripple Factor and Regulation Characteristics. Zener and Avalanche Breakdowns, Characteristics of Zener diode, voltage regulator, Tunnel Diode, Varactor Diode, Schottky Barrier Diode	

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Textbook 3: Chapter-8 Section 8.2-8.6, Chapter-5 Section 5.3, 5.4, 5.6, 5.7
Learning Outcomes:
At the end of the unit, the student will be able to
1. Describe the operation of rectifiers, and evaluate their performance metrics like ripple factor and regulation characteristics.(L2) 2. Explain the working principles of special diodes such as Zener diode, tunnel diodes, varactor diodes, and Schottky barrier diodes(L2)

UNIT-III	12 Lectures
Transistor Characteristics and Transistor Biasing: Operation of NPN and PNP junction Transistor, Current components in a transistor, Input and Output Characteristics of CB, CE, CC, relation between α, β, γ, typical transistor junction voltages, Comparison of CE, CB, and CC Configurations. Junction Biasing for Saturation, Cutoff and Active Region, Biasing circuits analysis, fixed bias, collector to base bias, emitter bias, voltage divider bias, thermal runaway, thermal stability, stability factors.	
Textbook 1: Chapter-5 Section 5.4 - 5.11 Textbook 3: Chapter-10 Section 10.1-10.8	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Describe the characteristics of transistor in CE, CB, and CC configurations.(L2) 2. Understand the principals of transistor biasing and stabilization(L2) 3. Analyse the transistor operation with different biasing techniques(L4)	

UNIT-IV	12 Lectures
Transistor at Low Frequencies: Small Signal: Transistor as an Amplifier, h – parameter model, Analysis of Transistor Amplifier Circuits using h –parameters, CB, CE and CC Amplifier configurations and performance factors, effects of Bypass and Coupling Capacitors. Multistage transistor Amplifier, RC Coupled Amplifier, Frequency Response and band width, Emitter – Follower	
Textbook 3: Chapter -11 Section 11.9 - 11.14 & 11.17 - 11.20	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Represent transistor with its equivalent h parameter model(L2) 2. Analyse the performance of transistor amplifiers with h Models(L4)	

UNIT-V	12 Lectures
Field Effect Transistors: Construction of JFET and its drain, transfer characteristics, pinch off Voltage, Drain Saturation Current, Construction of MOSFET –Enhancement and Depletion Modes, drain and transfer characteristics JFET Configurations, Common Source JFET biasing, fixed bias, self-bias, voltage divider bias.	

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Textbook 2: Chapter 5 Section 5.1 - 5.3, 5.7, 5.8, Chapter 6 Section 6.2, 6.3, 6.4
Learning Outcomes:
At the end of the unit, the student will be able to
1. Comprehend the characteristics of BJT and FET(L2) 2. Explain the construction of JFET and MoSFETs (L2) 3. Describe the characteristics of JFET and MoSFET (L2) 4. Understand various biasing methods for FETs (L2)

Text Books:
1.Jacob Millman, Christos C. Halkias, Integrated Electronics: Analog and Digital Circuits and Systems, McGraw-Hill. 2.Robert Boylestad, Louis Nashelsky, Electronic Devices and Circuit Theory, 7th Edition, Prentice Hall,1998 3.Sanjeev Gupta, Electronic Devices and Circuits, 2nd Edition, Dhanpat Rai Publications,2005.
Reference Books:
1. Thomas L. Floyd, Electronic Devices, 9th Edition, Prentice Hall, 2012. 2. B. V. Rao and K. Raja Rajeswari, Electronic Devices and Circuits 2nd Edition, Pearson Education,2010 3.Electronic Devices and Circuits, G. S. N. Raju, I. K. International Publications, New Delhi, 2006. 4. David A. Bell, Electronic Devices and Circuits, 5th Edition, Oxford University Press, 2008
Web References:
1. https://onlinecourses.nptel.ac.in/noc21_ee80/preview 2. https://be-iitkgp.vlabs.ac.in/

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(Approved by AICTE, New Delhi and Permanently Affiliated to Andhra University, Visakhapatnam)
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ANNEXURE - II

ELECTRONIC DEVICES AND CIRCUITS LAB

I Year B. Tech I semester

(Branch: ECE)

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course the student shall be able to:

CO1: Understand the operation of CRO for signal measurements (L2)
CO2: Analyze the characteristics of P-N junction diode and special diodes (L4)
CO3: Build the rectifier circuits and regulator circuits using diode (L3)
CO4: Analyze the operation and characteristics of BJT and FET (L4)
CO5: Construct and analyze the performance of BJT and FET amplifier circuits (L4)

List of Experiments:

1. Study of CRO and Applications.
2. Characteristics of PN Junction Diode
3. Characteristics of Zener Diode and Zener Voltage regulator.
4. Characteristics of Photo diode
5. Half-wave and full-wave rectifiers with diodes
6. Half-wave and full-wave rectifiers with capacitor filter
7. Characteristics of BJT CE configuration, h-parameters
8. Characteristics of BJT CB configuration, h-parameters
9. Voltage gain, input impedance and output impedance of emitter follower
10. Drain and transfer characteristics of JFET
11. Frequency response of CE amplifier
12. Demonstration of virtual tool for simulation of electronic device characteristics.

Reference Books:

1. Thomas L.Floyd, "Laboratory Exercises for Electronic Devices", 9th ed., Prentice Hall.
2. Robert Boylestad, Louis Nashelsky, Electronic Devices and Circuit Theory, 7th ed., Prentice Hall.
3. David A. Bell, "Laboratory manual for electronic devices and circuits", 4th ed., 2001.

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1. https://be-iitkgp.vlabs.ac.in/
2. https://www.multisim.com/content/t6fPJvwcHYMD4qzJSYpGHQ/edc-lab1/

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ANNEXURE - III

BASIC ELECTRONICS ENGINEERING
I Year B. Tech I semester
(Branch: EEE)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Brief evolution and impact of electronics.(L2)
CO2:	Comprehend the characteristics of semiconductors, devices, and their applications.(L2)
CO3:	Analyze the transistor operation with different biasing techniques(L4)
CO4:	Understand the characteristics of FET(L2)
CO5:	Outline the basic concepts and applications of op-amps(L2)

UNIT-I	12 Lectures
Introduction: Evolution and Impact of Electronics in industries and in society, Familiarization of Resistors, Capacitors, Inductors, Transformers and Cathode ray oscilloscope.	
TB3: Chapter -1, RB1: Chapter -1	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1.Explain the importance of Electronics. (L2) 2.Illustrate the basic elements of Electronics. (L1) 3.Understand the basic construction and working operation of CRO. (L1)	

UNIT-II	12 Lectures
Semiconductor Diodes: Semiconductor materials- intrinsic and extrinsic types, Ideal Diode, Terminal characteristics of diodes: p-n junction under open circuit condition p-n junction under forward bias and reverse bias conditions p-n junction in breakdown region, Diode small signal model, Zener diode and applications, Rectifier Circuits.	
TB1: Chapter -4,5,6	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Explain the energy band theory of solids (insulators, semiconductors, and metals) based on their band structures.(L1) 2. Describe the transport phenomena in semiconductors(L1) 3. Understand the band structure representation of PN junction, interpret the Volt-Ampere characteristics along with the temperature effects(L2)	

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UNIT-III	12 Lectures
Bipolar Junction Transistors (BJTs) Physical structure and operation modes, Active region operation of transistor, D.C. analysis of transistor circuits, Transistor as an amplifier, Transistor as a switch: cut-off and saturation modes Biasing the BJT: fixed bias, emitter feedback bias, collector feedback bias Basic BJT amplifier configuration: common emitter, common base and common collector amplifiers.	
TB1: Chapter -7, Chapter -8	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1.List the various amplifier configurations. (L1) 2.Interpret the frequency response and relationship between gain and bandwidth in amplifiers. (L2) 3.Design and analyze different amplifier configurations. (L4)	

UNIT-IV	12 Lectures
Field Effect Transistor (FET) Junction Field-Effect Transistor (JFET), structure and physical operation, current-voltage characteristics, Enhance type MOSFET, Depletion-type MOSFET, D.C. operation of MOSFET circuits, Biasing in MOSFET amplifiers, Basic JFET amplifier configuration: common source, common gate and common drain types.	
TB1: Chapter -12	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Comprehend the characteristics of BJT and FET(L1) 2. Explain the construction of JFET and MOSFETs(L2) 3. Describe the characteristics of JFET and MOSFET(L2) 4. Understand various biasing methods for FETs(L2)	

UNIT-V	12 Lectures
Operation Amplifier (Op-amps) Ideal Op-amp, Differential amplifier: differential and common mode operation common mode rejection ratio (CMRR), Practical op-amp circuits: inverting amplifier, non -inverting amplifier, weighted summer, integrator, differentiator.	
RB 3: Chapter -1,2	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1.Understand the basic parameters of Op-amp. (L1) 2.Illustrate the applications of Operation Amplifiers. (L2)	

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Text Books:
1.Integrated Electronics, Jacob Millman and C.C.Halkias, McGraw Hill, 1972. 2.Bell, D. A., Electronic Devices and Circuits, Oxford University Press.2001
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1. Electronic Devices and Circuits by Salivahanan, N.Suresh Kumar andA.Vallava Raj TMH, 2nd Edition, 1998. 2. Electronic Devices and Circuits – G.K.Mithal, Khanna Publishers, 23rd Edition, 2004. 3. Linear integrated circuit 2nd edition D. Roy Choudhary, 2017 4. Principles of Electronics, V.K.Mehta, S.Chand Publications,2022
Web References:
1.https://onlinecourses.nptel.ac.in/noc24_ee143/preview 2.https://onlinecourses.nptel.ac.in/noc24_ee73/preview

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ANNEXURE - IV

ELEMENTS OF ELECTRONICS ENGINEERING

I Year B. Tech I semester/II Semester
(Common to branches: CSM,CSE,IT)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Outline the concepts of semiconductor devices(L2)
CO2:	Understand the characteristics of different semiconductor diodes and their applications(L2)
CO3:	Apply various biasing techniques for design of BJT circuits(L3)
CO4:	Apply hybrid models to understand the operation of BJT amplifier(L3)
CO5:	Understand the characteristics of FET(L2)

UNIT-I	10 Lectures
Introduction to Electronics and Semiconductors: Energy band theory, Conduction in Insulators, Semiconductors and metals, Classification of semiconductors, Properties of intrinsic and extrinsic semiconductor, Carrier concentration in an intrinsic semiconductor, Drift, and diffusion currents.	
Textbook 1: Chapter -1 Section 1.6, 1.7, 1.8 Textbook 1 Chapter -2 Section 2.2, 2.3, 2.9 Textbook 1 Chapter -19 Section 19.5	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Explain the energy band theory of solids (insulators, semiconductors, and metals) based on their band structures(L2) 2. Describe the transport phenomena in semiconductors. (L2)	

UNIT-II	14 Lectures
Semi-Conductor Diode: Theory of PN junction, Open circuited PN junction, V-I characteristics of a PN diode, Diode current equation, basics on junction capacitance, Break down in PN diode, Applications of PN diodes. Zener diode, Zener regulator, Tunnel diode, Schottky diode. **Rectifying circuits:** Half wave and full wave rectifiers, Bridge rectifiers, Efficiency, Ripple and regulation of each rectifier, Capacitor filters.	
Textbook 2: Chapter 4 Section 4.1 – 4.5, 4.8 Textbook 2: Chapter 5 Section 5.3, 5.4, 5.7 Textbook 2: Chapter 8 Section 8.2 – 8.4, 8.6	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Explain the formation of PN junction and represent the band structure, interpret the	

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Volt-ampere characteristics (L2) 2. Describe the operation of rectifiers, and evaluate their performance metrics like ripple factor and regulation characteristics(L2) 3. Explain the working principles of special diodes such as Zener diode, tunnel diodes and Schottky barrier diodes.(L2)

UNIT-III	14 Lectures
Bipolar Junction Transistor: Introduction, construction, Operation of PNP and NPN Transistors, transistor configurations, Input and Output Characteristics of CE configuration, Comparison of CE, CB, and CC Configurations. **Transistor Biasing and thermal stabilization:** Junction Biasing for Saturation, Cutoff and Active Region, Biasing circuits analysis, fixed bias, collector to base bias, emitter bias, voltage divider bias, thermal runaway.	
Textbook 2: Chapter 6 Section 6.1 - 6.3, 6.6-6.9, 6.11, Chapter 10 Section 10.4 - 10.8	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Describe the characteristics of transistor in CE, CB, and CC configurations.(L2) 2. Understand the principals of transistor biasing and compensation methods(L2) 3. Identify the charectistics of different transistor biasing techniques(L3)	

UNIT-IV	10 Lectures
Transistor Amplifiers: CE, CB, CC amplifier configurations –Multistage amplifier – A Two Stage RC coupled amplifier – frequency response curve and bandwidth.	
Textbook 2: Chapter -11 Section 11.9, 11.11, 11.12, 11.16, 11.17, 11.20	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Represent transistor with its equivalent h parameter model (L2) 2. Apply hybrid models to obtain the performance of transistor amplifiers(L3)	

UNIT-V	12 Lectures
Field Effect Transistors: Construction of JFET and its drain, transfer characteristics, pinch off Voltage, Drain Saturation Current, parameters of JFET, Construction of MOSFET – Enhancement and Depletion Modes, drain and transfer characteristics.	
Textbook 2: Chapter -7 Section 7.1 – 7.5, 7.11, 7.12	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Comprehend the characteristics of BJT and FET(L2) 2. Explain the construction of JFET and MoSFETs (L2) 3. Describe the characteristics of JFET and MoSFET (L2)	

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Text Books:
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Reference Books:
1.Thomas L.Floyd, Electronic Devices, 9th Edition , Prentice Hall, 2012. 2.B. V. Rao and K. Raja Rajeswari, Electronic Devices and Circuits 2nd Edition, Pearson Education.,2010. 3.David A. Bell, Electronic Devices and Circuits, 5th Edition, Oxford University Press, 2008 4.Robert Boylestad, Louis Nashelsky, Electronic Devices and Circuit Theory, 7th Edition, Prentice Hall,1998
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ANNEXURE - V

DIGITAL LOGIC DESIGN

I Year B. Tech. II semester

(Common to the branches: ECE,CSE,CSM,IT)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Represent different number systems & binary codes and perform conversions & binary arithmetic (L2)
CO2:	Apply different simplification methods for minimizing Boolean functions. (L3)
CO3:	Model various combinational circuits using gates and PLD's. (L3)
CO4:	Outline the concept of latches and flip-flops. Construct sequential logic circuits like counters and registers using flip-flops. (L3)
CO5:	Categorize Mealy & Moore models and Design Synchronous Sequential machines. (L3)

UNIT-I	10 Lectures
Number systems: Number systems, Base conversion methods, Representation of signed numbers and Binary Arithmetic. **Codes:** Binary, Non binary, Decimal, Alphanumeric, XS-3, Gray. Error detecting and error correcting codes. **Logic Gates:** AND, OR, NOT, NAND, NOR, XOR, EX-NOR.	
(TB1: Chapter1, Chapter 2: section 2.1 to 2.8)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1.Understand the advantages of using different number systems. (L2) 2.Describe the usefulness of different binary codes. (L2) 3.Summarize the error detection and correction concepts. (L2)	
UNIT-II	10 Lectures
Minimization of Boolean Functions: Fundamental postulates of Boolean algebra, Basic theorems, Simplification of Boolean equations, Min terms, Max terms, Standard form of Boolean functions. Simplification of functions using Karnaugh map method (2,3,4,5 variables) Don't care conditions, AOI implementation, NAND and NOR Realizations.	
(TB1: Chapter 2: Sections 2.11 to 2.19,2.21,2.22,2.23, Chapter 3: sections 3.2 to 3.6,3.7)	

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Learning Outcomes:
At the end of the unit, the student will be able to
1.Apply basic laws and theorems to simplify Boolean expressions and construct logic circuit. (L3) 2.Understand concepts of sum-of-products and product-of-sums representations. (L2) 3.Apply K- Map for minimizing logic functions and build logic circuits. (L3)
UNIT-III 14 Lectures
Combinational Logic-Circuit Design-I: Logic design of combinational circuits: Adders and Subtractors: Binary, BCD, Excess-3 and Look–ahead-carry adder, Code converters, Multiplexers, De multiplexers, Encoders, Decoders and priority encoders, Realization of Boolean functions using multiplexers and Decoders. **Combinational Logic-Circuit Design-II:** Design of 4-bit comparator, Parity checker/Generator. Basics of PLDs: Basic structure of PROM, PAL, PLA, Realization of Boolean functions with PLDs and their merits and demerits.
(TB1: Chapter 4: section 4.1 to 4.27, Chapter 5 Sections 5.1 to 5.11)
Learning Outcomes:
At the end of the unit, the student will be able to
1.Apply Boolean algebra for describing combinational digital circuits (L3) 2.Describe standard combinational circuits such as adders, subtractors, comparators etc. (L2) 3.Develop the digital circuits using PLDs (L3)
UNIT-IV 12 Lectures
Sequential circuits: Classification of sequential circuits, SR-latch, Gated latches, Flip flops: RS, JK, D, T and Master slave flip flops, Excitation tables, flip flop conversion from one type to another. Design of counters: Ripple counters, Synchronous counters, asynchronous counters, up-down counters, Johnson counter, ring counter. Design of registers: Buffer registers, Shift registers, Bi directional shift registers, Universal shift register.
(TB1: Chapter 6)
Learning Outcomes:
At the end of the unit, the student will be able to
1.Understand the principle of Flip-Flops and Latches. (L2) 2.Summarize the concepts of Shift Registers and Counters. (L2) 3.Construct different sequential logic circuits using Flipflops. (L3)
UNIT-V 10 Lectures
Analysis and Design of Synchronous Sequential Machine: Moore and Mealy machine models, State Equations, State Table, State diagram, State reduction & assignment, Synthesis of synchronous sequential circuits- sequence detector and generator.
(TB1: Chapter 7 Sections 7.1 to 7.5)

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Learning Outcomes:
At the end of the unit, the student will be able to
1.Understand Moore and Mealy machine models (L2) 2.Discuss the concepts of State assignment & Reduction (L2) 3.Analyse the design and synthesis of synchronous sequential circuits (L3)
Text Books:
1.A. Anand Kumar, Switching Theory and Logic Design. PHI, 2014. 2.M. Morris Mano and Michael D. Ciletti, Digital Design, 4th Edition, Pearson Education, 2013.
Reference Books:
1.Foundation of Switching theory and Logic Design, A k Singh, New age International Publishers,2008 2.Modern Digital Electronics, R P Jain, 4th Edition, Tata McGraw Hill Education Pvt. Ltd, New Delhi,2010 3.Fundamentals of Logic Design, Charles. R. Roth, Thomson Publications,5th edition,2004
Web References:
1.https://nptel.ac.in/courses/108105132 (Digital Electronic Circuits) 2.https://onlinecourses.nptel.ac.in/noc24_ee147/preview (Digital Circuits) 3.https://nptel.ac.in/courses/117105080 (Digital Systems Design) 4.https://onlinecourses.swayam2.ac.in/nou24_ec07/preview (Digital electronic and System design)

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ANNEXURE - VI

ELECTRONIC CIRCUIT ANALYSIS

I Year B. Tech. II semester

(Branch: ECE)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Formulate small signal high frequency amplifiers using BJT and FET(L3)
CO2:	Classify multistage amplifiers(L2)
CO3:	Design different types of feedback amplifiers(L3)
CO4:	Interpret the condition for oscillations in oscillators and design different types of oscillators (L3)
CO5:	Analyse and Examine different types of power amplifiers and Tuned amplifiers ,compare them in terms of efficiency(L4)

UNIT-I	12 Lectures
Small Signal High Frequency Transistor Amplifier models: BJT: Transistor at high frequencies, Hybrid- π common emitter transistor model, Hybrid-π conductance's, Hybrid-π capacitances, validity of Hybrid-π model, determination of high frequency parameters in terms of low frequency parameters, Millers Theorem and its Dual, CE short circuit current gain, current gain with resistive load, cut-off frequencies, frequency response and gain bandwidth product. FET: Analysis of common source and common drain amplifier circuits at high frequencies.	
TB1: Chapter -11, Chapter -8:Section 8.11, Chapter -10:Section 10-10 & 10-11	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1.Explain the Hybrid-π model of BJT and FET. (L2) 2.Apply Hybrid-π model to BJT and FET amplifiers. (L3) 3.Analyze BJT and FET amplifiers with Hybrid-π model . (L3)	
UNIT-II	12 Lectures
Multistage Amplifiers: BJT and FET RC Coupled Amplifiers – Frequency Response. Cascaded Amplifiers. high input resistance transistor amplifiers- Darlington and Bootstrap circuits, Calculation of Band Width of Single and Multistage Amplifiers. Concept of Gain Bandwidth Product.	
TB1: Chapter -10	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1.List the various multistage amplifiers. (L1) 2.Interpret the frequency response and relationship between gain and bandwidth in amplifiers. (L2)	

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3.Design and analyze different multistage amplifiers. (L2)
UNIT-III 10 Lectures
Feedback Amplifiers: Classification of Amplifiers, Concept of Feedback Amplifiers – Effect of Negative feedback on the amplifier Characteristics. Four Feedback Amplifier Topologies. Method of Analysis of Voltage Series, Current Series, Voltage Shunt and Current Shunt feedback Amplifiers.
TB1: Chapter -13
Learning Outcomes:
At the end of the unit, the student will be able to
1.Outline the basic amplifiers and fundamental concepts of Feedback amplifiers. (L2) 2.Design and analyze feedback amplifiers using each of the four topologies. (L3) 3.Compare the advantages and disadvantages of each feedback topology in different applications. (L3)
UNIT-IV 10 Lectures
Sinusoidal Oscillators: Condition for oscillations – RC Oscillators -- RC Phase Shift and Wein bridge Oscillators(BJT and JFET models),LC Oscillators – Hartley, Colpitts, Clapp and Tuned Collector Oscillators, Frequency and amplitude Stability of Oscillators– Crystal Oscillators.
TB1: Chapter -14:Section 14-15 to 14-21
Learning Outcomes:
At the end of the unit, the student will be able to
1.Describe the significance of the loop gain and phase shift in sustaining oscillations. (L2) 2.Determine the frequency of oscillation and design criteria for RC, LC and crystal oscillators. (L3) 3.Compare the performance of crystal oscillators with other types of oscillators (L3)
UNIT-V 12 Lectures
Tuned Voltage Amplifiers and Power Amplifiers: Single Tuned and Stagger Tuned Amplifiers – Analysis, Double Tuned Amplifier, and Bandwidth Calculation. Classification of Power Amplifiers – Class A, Class B and Class AB power Amplifiers. Series Fed, Single Ended Transformer Coupled Class A Power Amplifiers. Harmonic Distortions, Class B Push-pull amplifiers and their analysis, Complementary symmetry push pull amplifier, Class AB power amplifier.
TB1: Chapter -18, RB1: Chapter -13
Learning Outcomes:
At the end of the unit, the student will be able to
1.List the varieties of Tuned and Power Amplifiers. (L1) 2.Illustrate the operation of Tuned and power amplifiers. (L2) 3.Design and analyze various Tuned and power amplifiers. (L4)
Text Books:
1. Jacob Millman and C.Halkias, Integrated Electronics, Analog Digital Circuits and systems McGraw Hill, 1972. 2. Adel S. Sedra, Kenneth C. Smith, Arun N. Chandorkar, Microelectronic Circuits, 6/e, Oxford University Press, 2013.

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3.B.V.Rao, K. RajaRajeswari et.al, Electronic Circuit Analysis ,Pearson Publishers,2010

Reference Books:

1.Salivahanan, N.Suresh Kumar,Electronic Devices and Circuits, TMH, 4th Edition,2017
2.G.K.Mithal, Electronic Devices and Circuits, Khanna Publishers, 23rd Edition, 2004.
3.Robert L. Boylestad and Louis Nashelsky Electronic Devices and Circuits Theory, Pearson/Prentice Hall, Tenth Edition,2009

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ANNEXURE - VII

DIGITAL LOGIC DESIGN LAB
I Year B. Tech. II semester
(Branch: ECE)

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course the student shall be able to:

CO1: Verify the functional behavior of different logic gates and realize the Boolean expressions using these gates. (L3)
CO2: Build combinational circuits to implement different logic functions.(L3)
CO3: Verify the functional behavior of different Flipflops (L3)
CO4: Construct sequential circuits like counters and registers using flip-flops.(L3)
CO5: Make use of Digital ICs for verification and design of Digital circuits.(L3)

List of Hardware Experiments:

1. Verification of Logic Gates
2. Verification of Demorgan's Laws
3. Realization of Gates by using universal building blocks
4. Realization of SOP and POS
5. Half Adder & Full adder
6. Implementation of a function by using Decoders
7. Implementation of a function by using Multiplexers.
8. 3 bit Parity Generator
9. Verification of Flip - flops
10. Mod-8 Synchronous counter
11. Johnson Counter
12. 4 - bit Shift-register

Reference Books:

1. Digital Electronics-A Comprehensive ab manual by Cherry Bhargava, BS Publications, 2019.
2. Switching theory and Logic Design by Prof. K. Sivani and Prof. B. Ramadevi, BlueRose publishers, 2020.

Web References:

1. https://dec-iitkgp.vlabs.ac.in/
2. https://de-iitr.vlabs.ac.in/
3. https://de-iitg.vlabs.ac.in/

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ANNEXURE - VIII

ELECTRONIC CIRCUIT ANALYSIS LAB
I Year B. Tech. II semester
(Branch: ECE)

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course the student shall be able to:

CO1: Design and analyze feedback amplifiers (voltage series and current shunt feedback amplifiers) (L3)
CO2: Design and analyze various oscillators (RC phase shift oscillator and Colpitt's oscillator. (L3)
CO3: Design and analyze various amplifiers (Multi stage amplifiers and Single tuned amplifier) (L3)
CO4: Design and analyze power amplifiers (Class A and Class B complimentary symmetry)(L3)
CO5: Become expert with computer skills (Multisim, OrCAD Pspice and Capture) for the analysis and design of circuits (L3)

List of Experiments :

Cycle I (Hardware)

1. Voltage-Series Feedback Amplifier
2. Current-Shunt Feedback Amplifier
3. RC Phase Shift Oscillator
4. Colpitt's Oscillator
5. Two Stage RC Coupled Amplifier
6. Darlington Pair Amplifier

Cycle II (Software)

7. Class A Series-fed Power Amplifier
8. Transformer-coupled Class A Power Amplifier
9. Wien Bridge Oscillator
10. Hartley Oscillator
11. Complementary Symmetry Class B Push-Pull Power Amplifier
12. Single Tuned Voltage Amplifier

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Equipment required:

Software:

i. Multisim/ Equivalent Industrial Standard Licensed simulation software tool.
ii. Computer Systems with required specifications

Hardware:

1. Regulated Power supplies
2. Analog/Digital Storage Oscilloscopes
3. Analog/Digital Function Generators
4. Digital Multimeters
5. Decade Résistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Active & Passive Electronic Components

Reference Books:

1. Electronic Devices, Thomas L.Floyd, Tenth edition,2012
2. Electronic Devices and Circuits, David A. Bell, Fifth Edition,2008

Web References:

1.https://www.circuitlab.com

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ANNEXURE - I

FUNDAMENTALS OF ELECTRICAL ENGINEERING

I B. Tech.-I semester

(Branch: EEE)

Course Code: **L-T-P-C: 4-0-0-3**

Course Outcomes: At the end of the Course, the student shall be able to	
C01:	Summarize the basic concepts in electric circuits.
C02:	Apply the fundamental laws in Electrical Engineering
C03:	Summarize the operation of various measuring instruments.
C04:	Summarize the concepts of various magnetic and dielectric materials.
C05:	Design the wiring schemes for house hold appliances using appropriate wiring components.

UNIT-I	12 Lectures
Electrical Engineering Fundamentals: Electrical circuit elements, DC sources (independent and dependent), Ohm's law, effect of temperature on resistance, temperature coefficient, Kirchhoff's laws, Power and Energy Calculations for DC circuits, Series-parallel connection of elements, Concept of Potential difference, Star - Delta conversion with R only. TextBook-1: Chapter 1 (Pg. 1-31) TextBook-1: Chapter 2 (Pg. 32-75) TextBook-1: Chapter 4 (Pg. 130-147)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Understand the concepts of active and passive elements. 2. Determine the power and energy for the given electrical elements. 3. Analyse the Basic Electric Circuits.	

UNIT-II	12 Lectures
Fundamental Laws of Electrical Engineering: Coulombs law of Electrostatics (1st and 2nd laws), Faradays laws of Electromagnetic induction, Concepts of self and mutual induced emfs, Fleming Left hand and Right-hand rules, Lenz's law, Biot - Savart's law, Ampere circuital law, Maxwell's corkscrew rule. TextBook-1: Chapter 5 (Pg. 151) TextBook-1: Chapter 7 (Pg. 217-219, 224-225) TextBook-1: Chapter 9 (Pg. 255-270)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Summarize the Basic Laws of electrostatics. 2. Understand the concepts of self and mutual induced emfs. 3. Summarize the Basic Laws of electromagnetic induction.	

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UNIT-III	12 Lectures
Fundamentals of Electrical Measurements (no need to explain types of errors and compensations): Classification of measuring instruments, various forces in indicating instruments (deflection, control and damping), construction and operation of MC and MI type instruments for voltage and current measurement, Construction and operation of single-phase electro dynamometer type wattmeter, Construction and operation of single-phase induction type energy meter, basic concept of digital energy meter. TextBook-1: Chapter 25 (Pg. 670-718)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Summarize different types of the Measuring Instruments. 2. Understand the operation of Measuring Instruments. 3. Summarize the various operating forces involved in the Measuring instruments.	

UNIT-IV	12 Lectures
Dielectric and Magnetic Materials: Dielectric as an electric field medium, leakage currents, dielectric loss, dielectric strength, breakdown voltage, effects of breakdown, Ferroelectric materials, properties of ferroelectric materials, spontaneous polarization, piezoelectric materials, pyroelectric materials. classification of magnetic materials, properties of ferromagnetic materials, spontaneous magnetization, magnetic anisotropy, characteristics of soft and hard magnetic materials, ageing of magnets. TextBook-2: Chapter 5 (S-5.1-5.4) TextBook-2: Chapter 7 (S-7.4-7.18)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Understand the dielectric materials and their properties 2. Understand the magnetic materials and their properties 3. Summarize the knowledge on materials used in electrical applications.	

UNIT-V	12 Lectures
Electric Wiring: Symbols of various electrical equipment, Various types of conductors, conductor sizes and current ratings, Service mains, meter board and distribution board, Types of wirings and their Installations, House wiring (one lamp-one switch, Stair case, Corridor wiring, Power wiring), Basic LT panel wiring diagram, Elementary discussion on Circuit protective devices: fuse and Miniature Circuit Breaker (MCB's). TextBook-3: http://182.160.97.198:8080/xmlui/handle/123456789/853?show=full	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Identify and interpret various electrical wiring symbols. 2. Acquire knowledge on different types of wiring and their installations. 3. Learn about various types of protective devices.	

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ANNEXURE - II

ELECTRICAL CIRCUITS 1

I Year B. Tech. II semester

(Branch: EEE)

Course Code:	L	T	P	C
	4	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to:	
C01:	Analyse the electrical networks using mesh and nodal analysis techniques.
C02:	Analyse Electrical circuits with AC excitation.
C03:	Summarize the applications of network theorems.
C04:	Summarize the concept of resonance and understand bandwidth, Q factor, and locus diagrams.
C05:	Analyze magnetic circuits and understand the concepts of graph theory.

UNIT-I	10 Lectures
Introduction to Electrical Circuits: concepts of electrical circuit elements and their V-I relations; source transformation and Network Simplification Techniques (Series, Parallel, Series-Parallel, Star-delta transformations), Nodal analysis method, Mesh analysis method including super node and super mesh analysis. Concept of duality and dual networks	
TextBook-1: Chapter 1 (S-1.1 – S-1.6) TextBook-1: Chapter 2 (S-2.1 – S-2.7) TextBook-1: Chapter 3 (S-3.1- S-3.5)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Summarize the basic electrical elements and different fundamental laws.(L2) 2. Apply the Kirchhoff's Laws in solving series, parallel, non-series-parallel configurations in DC networks.(L2) 3. Understand the principle of duality and dual networks.(L2)	

UNIT-II	10 Lectures
Single Phase A.C Circuits: Periodic and non-periodic wave forms, R.M.S, Average Values and Form Factor for Alternating Quantities – Phase and Phase Difference – Complex and Polar Forms of Representations, j-Notation, Steady State Analysis of R, L and C (In Series, Parallel and Series Parallel Combinations) with Sinusoidal Excitation. Phasor diagrams - Concept of Reactance, Impedance, Susceptance and Admittance. Power triangle - Apparent Power, Active and Reactive Power, Concept of Power Factor Examples.	
TextBook-1: Chapter 11 (S-11.1 – S-11.7) TextBook-1: Chapter 9 (S-9.1 – S-9.7)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Analyse the periodic and non-periodic waveforms. (L3) 2. Perform steady-state analysis of R, L, and C circuits with sinusoidal excitation. (L2) 3. Determine the power factor, reactance, impedance, and power types. (L2)	

UNIT-III	10 Lectures
Network theorems: Superposition theorem, Thevenin's theorem, Norton's theorems, Maximum power transfer theorem, Tellegen's theorem, Compensation theorem, Milliman's theorem and Reciprocity theorem.(DC & AC with dependent and independent Excitations).	
TextBook-1: Chapter 4 (S-4.1 – S-4.8) Reference Book-2: Chapter 4 (S-4.1 – S-4.10)	

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Learning Outcomes:
At the end of the unit, the student will be able to
1. Analyse the circuits using theorems for DC Excitation. (L3) 2. Analyse the circuits using theorems for AC Excitation. (L3) 3. Summarize the applications of theorems. (L2)

UNIT-IV	10 Lectures
Resonance and locus Diagrams: Series and parallel resonance circuits, concept of band width and Q factor. **Locus diagram:** RL, RC, RLC with R, L and C variables.	
TextBook-2: Chapter 16 (S-16.1– S-16.4) https://ggsestc.digimat.in/nptel/courses/video/108105065/L06.html	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Understand the principles of series and parallel resonance in electrical circuits. (L1) 2. Apply the resonance concepts to analyse the electrical circuits. (L2) 3. Interpret the locus diagrams for RL, RC, and RLC circuits. (L3)	

UNIT-V	10 Lectures
Coupled circuits: Concept of self and mutual inductance, Dot convention, Coefficient of coupling, Analysis of Series and Parallel Magnetic Circuits with mutual inductance. **Network Topology:** Basic concepts of Graph theory, incident matrix, tie-set matrix and cut-set matrix.	
TextBook-1: Chapter 13 (S-13.1 – S-13.6) Reference Book-2: Chapter 9 (S-9.1 – S-9.6) Reference Book-2: Chapter 3 (S-3.1 – S-3.8)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Understand the self and mutual inductance and apply the dot convention in coupled circuits.(L1) 2. Analyse series and parallel magnetic circuits with mutual inductance. (L2) 3. Apply Graph Theory to solve the electrical circuits. (L3)	

Text Books:
1. Fundamentals of Electric Circuits Charles K. Alexander and Matthew. N. O. Sadiku, Mc Graw Hill, 6th Edition, 2017. 2. Engineering circuit analysis William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 8th Edition, 2012.
Reference Books:
1. Network Analysis, M. E. Van Valkenburg, Pearson Education, 2019, Revised Third Edition. 2. Circuit Theory Analysis & Synthesis A. Chakrabarti, Dhanpat Rai & Sons, 7th Revised Edition, 2018. 3. Electric Circuits (Schaum's outline Series), Mahmood Nahvi, Joseph Edminister, and K. Rao, Mc Graw Hill Education, 2010, Fifth Edition.
Web References:
1. https://archive.nptel.ac.in/courses/108/105/108105159/ 2. https://nptel.ac.in/courses/108104139

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Text Books:
1. V. K. Mehta, Rohit Mehta, Principle of electrical Engineering and electronics, 3rd edition, S. Chand Publishing, New Delhi, 2016. (CO-1, 2 & 3) 2. R.K. Rajput, A course in Electrical Engineering Materials, Laxmi Publications 2009. (CO-4) 3. S L Uppal and G C Garg, "Electrical Wiring, Estimating & Costing", Khanna Publishers, 2015. (CO-5)
Reference Books:
1. Fundamentals of Electrical Engineering Rajendra Prasad PHI Third Edition 2014. 2. V. N. Mittal and Arvind Mittal, "Basic Electrical Engineering" McGraw Hill. 3. A.K. Sawhney, A Course in Electrical and Electronics Measurements and Instruments DhanpatRai and Sons, Delhi, 2005.
Web References:
1. https://archive.nptel.ac.in/courses/108/105/108105153/ 2. https://archive.nptel.ac.in/courses/108/105/108105112/

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ANNEXURE - III

THERMAL AND HYDRO PRIME MOVERS

I Year B. Tech. II semester

(Branch: EEE)

Course Code: **L-T-P-C:4-0-0-3**

Course Outcomes: At the end of the Course, the student shall be able to	
C01:	Classify internal combustion engines& boilers and assess the performance. (L2)
C02:	Analyse the various Vapour Power Cycles (L3)
C03:	Analyze the different methods for improving the efficiency of gas turbines (L4)
C04:	Determine the forces acting on the stationary & moving vanes and summarize the operation of pumps (L3)
C05:	Summarize the working of various types of hydraulic turbines.(L2)

UNIT-I	12 Lectures
I.C Engines: Classification, Basic idea of IC engine, Parts in IC engine, working principle of 2-stroke & 4-Stroke engines, ValveTiming Diagram, Port Timing Diagram, Comparison of 4 Stroke & 2 Stroke engine, Petrol Engine and Diesel Engine, Engine performance evaluation. **Boilers:** Classification of Boilers, Simple Vertical Boiler, Cochran Boiler, Babcockand Wilcox Boiler, Benson Boiler. Difference between Fire Tube and Water Tube Boilers, Boiler Mountings and Accessories.	
Text Book-1: Chapter 23 (S-23.1 – S-23.14, S-23.39) Text Book-1: Chapter 11 (S-11.1 – S-11.3, S-11.6-11.8) Text Book-1: Chapter 12 (S-12.1 – S-12.3)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Understand the construction and working principles of 2 stroke and 4 stroke I. C engines using petrol and diesel. (L2) 2. Evaluate the performance parameters of I. C. engines. (L3) 3. Summarize the construction and working principles of fire tube and water tube boilers. (L2)	

UNIT-II	12 Lectures
Properties of Steam and use of Steam Table: T-S and H-S Diagrams. Analysis of Various Thermodynamic Processes under gone by Steam. **Vapour Power Cycles:** Carnot Cycle-Rankine Cycle- Thermodynamic Variables Effecting Efficiency and output of Rankine Cycle-. Analysis of simple Rankine Cycle. Schematic layout of steam power plant.	
Text Book-1: Chapter 2 (S-2.1 – S-2.18) Text Book-1: Chapter 15 (S-15.1 – S-15.2)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Analyse the properties of Steam by using Steam Tables- T-S and H-S Diagrams. (L3)	

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2. Understand the working of various vapour power cycles, layout of steam power plant. (L2) 3. Summarize the variables effecting the efficiency and output of rankine cycle (L3)
UNIT-III 12 Lectures
Gas Turbines: Simple gas turbine plant-ideal cycle, closed cycle, open cycle-. Efficiency, Work ratio and optimum pressure ratio for simple gas turbine cycle. Actual cycle, analysis of simple cycles & cycles with inter cooling, reheating and Regeneration.
Text Book-1: Chapter 25 (S-25.1 – S-25.6)
Learning Outcomes:
At the end of the unit, the student will be able to
1. Understand the working of various gas turbine plant cycles. (L2) 2. Analyse the performance parameters for gas turbine cycle. (L3) 3. Summarize the different methods for improving the efficiency of gas turbines(L4)

UNIT-IV 12 Lectures
Impact Of Jets On Vanes: Impulse momentum equation, Impact of Jet on stationary and moving vanes (flat and curved). **Pumps:** Types of pumps, Centrifugal pumps: Main components, Working principle, Multi stage pumps, Performance and Characteristic curves.
Text Book-2: Chapter 17 (S-17.1 – S-17.4.4) Text Book-2: Chapter 19 (S-19.1 – S-19.2, S-19.6, S-19.10)
Learning Outcomes:
At the end of the unit, the student will be able to
1. Apply impulse momentum equationsto find the forces acting on the vanes. (L3) 2. Understand the working of centrifugal pump and its types. (L2) 3. Summarize the Performance Characteristics of the pumps. (L2)

UNIT-V 12 Lectures
Hydraulic Turbines: Classifications of turbines; Working principle of Pelton turbine, Francis turbine, Kaplan turbine, Efficiency calculation, Governing of turbines, Performance and characteristic curves, working of hydro electric power plant.
Text Book-2: Chapter 18 (S-18.1 – S-18.9, S-18.13 – S-18.14)
Learning Outcomes:
At the end of the unit, the student will be able to
1. Understand the working of hydro electric power plant, hydraulic turbines (L2) 2. Evaluate the performance parametersof hydraulic turbine. (L3) 3. Summarize theperformance characteristics of hydraulic turbine (L2)

Text Books:
1. Thermal Engineering by Rajput, Lakshmi publications. 2. R.K. Bansal, Fluid Mechanics And Hydraulic Machines, 10th Edition, Laxmi Publications, 2018.
Reference Books:
1. A Textbook of Thermal Engineering By RS Khurmi | JK Gupta 2. "Hydraulics & Fluid Mechanics", P.N. Modi and S.M. Seth, text books House, Delhi
Web References:
1. https://onlinecourses.nptel.ac.in/noc20_me33/ 2. https://archive.nptel.ac.in/courses/112/103/112103249/

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ANNEXURE – IV

ELECTRICAL ENGINEERING WORKSHOP
I Year B. Tech. II semester

Course Code: EE1207

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to:		**Exp. No.**
C01:	Identity, select, and troubleshoots the house wiring components.	1,2,3
C02:	Troubleshoot electrical appliances such as tube light, fan and domestic pump.	10,11
C03:	Develop house wiring schemes using protective equipment like MCB and ELCBs.	4,8,9
C04:	Design Go-down wiring /Tunnel wiring and hospital wiring schemes.	5,6
C05:	Measure the Basic Electrical Parameters using suitable instruments.	7,12,13

List of experiments:

1. Demonstration of electrical safety measures
2. Identification of various electrical tools and symbols
3. Identification of various electrical cables/wires, switches, fuses, fuse carriers, MCB, ELCB, RCCB, and MCCB with their specifications and use.
4. Wiring of lighting circuit using two-way control (Stair case wiring)
5. Godown wiring / tunnel wiring.
6. Hospital wiring
7. Measurement of voltage, current, power in DC circuits.
8. Wiring of power distribution arrangement using single phase MCB distribution board with ELCB, main switch and energy meter for calculating power and power factor.
9. Wiring of backup power supply for domestic installation including inverter, battery and load.
10. Troubleshooting of domestic electrical equipment's (tube light, fan)
11. Wiring and troubleshooting of domestic pump motor with DOL starter.
12. Demonstration of moving iron, moving coil, dynamometer, and induction type measuring instruments.
13. Identification of various types of resistors, and capacitors and understand the usage of digital multi-meter.

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ANNEXURE – V

Network Theory and Machines
I Year B. Tech. I semester
(Branch: ECE)

	L	T	P	C
Course Code:	4	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to:	
C01:	Analyze DC circuits using Kirchhoff's laws, nodal and mesh analysis methods.
C02:	Summarize network theorems and two-port network parameters.
C03:	Analyze circuits with AC excitations.
C04:	Determine the transient response of first and second-order circuits.
C05:	Understand the Construction and Principle of Operation of DC and AC machines.

UNIT-I	10 Lectures
Introduction to Electrical Circuits: Circuit Concept – Types of elements and their V-I relations; Kirchhoff's laws, Network Reduction Techniques- Series, Parallel, Series-Parallel, Star-delta transformation, Source transformation, Nodal analysis method and Mesh analysis method including super node and super mesh analysis.	
TextBook-1: Chapter 1 (S-1.1 – S-1.6) TextBook-1: Chapter 2 (S-2.1 – S-2.7) TextBook-1: Chapter 3 (S-3.1- S-3.5)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Understand the active and passive elements and their VI characteristics.(L2) 2. Analyse the electrical circuits using KVL and KCL.(L2) 3. Analyse the electrical circuits using mesh and nodal analysis.(L2)	

UNIT-II	10 Lectures
Network theorems: Superposition theorem, Thevinin's theorem, Norton's theorems, Maximum power transfer theorem and Reciprocity theorem (DC Excitations). **Two-port Networks:** Z-parameters, Y-parameters, Transmission line parameters, h- parameters, Parallel & series connection of two port networks, cascading of two port networks, problem solving using dependent sources also.	
TextBook-1: Chapter 4 (S-4.1 – S-4.8) TextBook-1: Chapter 19 (S-19.1 – S-19.6)	
Learning Outcomes:	
At the end of the unit, the student will be able to	
1. Summarize various network theorems.(L2) 2. Summarize the various two-port networks parameters. (L2) 3. Analyze the interconnected two port networks. (L2)	

UNIT-III	10 Lectures
Single Phase A.C Circuits: Periodic and non-periodic wave forms, R.M.S, Average Values and Form Factor for Alternating Quantities. Phase and Phase Difference, Steady State Analysis of R, L and C (In Series, Parallel and Series Parallel Combinations) with Sinusoidal Excitation. Phasor diagrams. Concept of Reactance, Impedance, Susceptance and Admittance. Power Triangle - Apparent Power, Active and Reactive Power - Concept of Power Factor.	

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Resonance: Introduction, Series resonance and parallel resonance, Definition of Q, Bandwidth and selectivity.
TextBook-1: Chapter 11 (S-11.1 – S-11.7) TextBook-1: Chapter 9 (S-9.1 – S-9.7) TextBook-2: Chapter 16 (S-16.1– S-16.4)
Learning Outcomes:
At the end of the unit, the student will be able to
1. Analyse periodic and non-periodic waveforms. (L2) 2. Analyze RLC circuits for AC excitations. (L2) 3. Determine bandwidth and selectivity in resonant circuits. (L2)

UNIT-IV 10 Lectures
DC Transients: Evaluation of initial conditions, First order circuits, Definition of time constant, R-L circuit, R-C circuit with excitation, second order circuits, problem-solving.
TextBook-1: Chapter 7 (S-7.1– S-7.6) TextBook-1: Chapter 8 (S-8.1– S-8.6)
Learning Outcomes:
At the end of the unit, the student will be able to
1. Evaluate initial conditions in electrical circuits. (L2) 2. Analyse first-order circuits. (L2) 3. Analyse second-order circuits. (L2)

UNIT-V 10 Lectures
DC Machines: Principle of operation of DC machines, Constructional Details, EMF equation, DC motor - Torque Equation, Speed control of shunt motor (Field and armature controlled methods), Applications of DC Machines. **AC Machines:** Transformer construction Details, Principle of operation, EMF equation, Three phase Induction Motors - Construction Details, Principle of operation. Single phase induction motor - Constructional Details, Principle of operation, Double Field Revolving Theory. Applications.
TextBook-3: Chapter 26 (S-26.1 – S-26.10 & S-26.33) TextBook-3: Chapter 29 (S-29.6 – S-29.8) TextBook-3: Chapter 30 (S-30.1 – S-30.2) TextBook-3: Chapter 32 (S-32.1 – S-32.6 & S-32.20-S-32.22) TextBook-3: Chapter 34 (S-34.1 – S-34.6) TextBook-3: Chapter 36 (S-36.1 – S-36.3)
Learning Outcomes:
At the end of the unit, the student will be able to
1. Understand the Construction and principle of operation of DC and AC machines. (L2) 2. Understand the speed control methods of electrical motors. (L2) 3. Summarize the applications of DC and AC machines. (L2)

Text Books:
1. Fundamentals of Electric Circuits Charles K. Alexander and Matthew. N. O. Sadiku, Mc Graw Hill, 5th Edition, 2013. 2. Engineering circuit analysis William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 7th Edition, 2006. 3. A Textbook of Electrical Technology: Ac and Dc Machines (volume - 2) by B L Theraja and A K Theraja.

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Reference Books:
1. Circuit Theory Analysis & Synthesis A. Chakrabarti, Dhanpat Rai & Sons, 7th Revised Edition, 2018. 2. Electric Circuits (Schaum's outline Series), Mahmood Nahvi, Joseph Edminister, and K. Rao, Mc Graw Hill Education, 2010, Fifth Edition. 3. Electric Machines, D. P. Kothari, I. J. Nagrath Tata McGraw-Hill, 2004.
Web References:
1. https://archive.nptel.ac.in/courses/108/105/108105159/ 2. https://nptel.ac.in/courses/108104139

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Annexure-7

ANNEXURE -1

CALCULUS AND DIFFERENTIAL EQUATIONS

I Year B. Tech. I Semester
(Common to All Branches)
EEE, ECE, CSE, IT, CSE (AI&ML)

Course Code: **L-T-P-C: 3-0-0-3**

Course Outcomes: At the end of the Course, the student shall be able to

CO1: Examine the functional dependency and **utilize** the Taylor's theorem to expand function of two variables. (L3)
CO2: Determine extrema of multivariable functions. (L5)
CO3: Utilize double and triple integrals to **evaluate** areas of plane curves and the volumes of solids. (L5)
CO4: Solve the first order differential equations and higher order differential equations with constant coefficients, **apply** the techniques to solve problems related to various engineering fields. (L3)
CO5: Find the Laplace Transforms of various functions and **apply** it to **solve** ordinary differential Equations with initial conditions. (L3)

UNIT-I: Partial Differentiation
Functions of two or more variables: Introduction - Partial derivatives - Total derivative - Change of variables - Jacobians – Functional dependence - Taylor's theorem for function of two variables.
(Sections: 5.1, 5.2, 5.5, 5.6, 5.7, 5.9 of Text Book)
Learning Outcomes:
At the end of the unit, the student will be able to

1. **Examine** the functional dependencies using the Jacobian. (L3)
2. **Make use of** Taylor's theorem to write series expansion of function of two variables. (L3)

UNIT-II: Applications of Partial Differentiation
Maxima and minima of function of two and three variables - Constrained maximum/minimum problems using Lagrange's method of multipliers.
(Sections: 5.11, 5.12 of Text Book)
Learning Outcomes:
At the end of the unit, the student will be able to

1. **Determine** the critical points, maxima and minima of functions several variables. (L5)

UNIT-III: Integral Calculus
Introduction - Double integrals - Change of order of integration - Double integrals in polar Coordinates - Triple integrals - Change of variables.
Applications: Area enclosed by plane curves - Volumes of solids.
(Sections: 7.1 – 7.7 of Text Book)
Learning Outcomes:
At the end of the unit, the student will be able to

1. **Evaluate** double integrals and triple integrals in Cartesian and polar coordinates also over the given region. (L5)
2. **Evaluate** the double integrals by change of order of integration. (L5)
3. **Evaluate** double and triple integrals by change of variables. (L5)
4. **Determine** the areas and volumes using multiple integrals. (L5)

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UNIT-IV: Differential Equations and its Applications

Exact differential equations - Equations reducible to exact equations - Solutions of higher order linear ordinary differential equations with constant coefficients - Method of variation of parameters.

Applications: Orthogonal Trajectories - Newton's law of cooling - Law of Natural growth and decay.
(Sections: 11.11, 11.12, 12.3, 12.6, 12.8, 13.1 – 13.8 of Text Book)

Learning Outcomes:

At the end of the unit, the student will be able to

1. **Solve** the first-order differential equations and higher order Linear differential equations with constant coefficients. (L3)
2. **Apply** the techniques to **solve** problems related to various engineering fields. (L3)

UNIT-V: Laplace Transforms

Introduction - Existence conditions - Transforms of elementary functions - Properties of Laplace transforms - Transforms of derivatives - Transforms of integrals - Multiplication by t - Division by t – Evaluation of integrals by Laplace transforms - Laplace transforms of Unit step function, Unit impulse function and Laplace transforms of periodic functions - Inverse Laplace transforms - Convolution theorem - Second shifting theorem.

Applications: Laplace Transforms to ordinary differential Equations.
(Sections: 21.1 – 21.5, 21.7 – 21.15, 21.17, 21.18 of Text Book)

Learning Outcomes:

At the end of the unit, the student will be able to

1. **Find** the Laplace transform of the function. (L1)
2. **Find** the Inverse Laplace transform of a function. (L1)
3. **Make use** of convolution theorem to find the Inverse Laplace transform of a function. (L3)
4. **Apply** Laplace transform to **solve** ordinary differential equations. (L3)

Text Books:

B. S. Grewal, Higher Engineering Mathematics, 45th Edition, Khanna Publishers, 2024.

Reference Books:

1. R K Jain and SRK Iyengar, Advanced Engineering Mathematics, Narosa Publishers, 5th Edition, 2016.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th edition, John Wiley & Sons, 2011.
3. Peter V. O'Neil, Advanced Engineering Mathematics, 7th edition, Cengage Learning, 2011.
4. Greenberg, Advanced Engineering Mathematics, 2nd Edition, Pearson, 2017.

Web References:

1. https://nptel.ac.in/courses/111104125
2. https://nptel.ac.in/courses/111105160

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ANNEXURE -2

LINEAR ALGEBRA AND VECTOR CALCULUS

I Year B. Tech. II Semester

(Common to All Branches)

EEE, ECE, CSE, IT, CSE (AI&ML)

Course Code: **L-T-P-C: 3-0-0-3**

Course Outcomes: At the end of the Course, the student shall be able to

CO1: Test for the consistency and **solve** linear system of equations, also **determine** unknown currents in the electrical circuits. (L5)

CO2: Find the Eigen values and Eigen vectors of a matrix, and **apply** Cayley- Hamilton theorem to find the inverse of a matrix. (L3)

CO3: Reduce quadratic form to canonical form and **examine** the nature of quadratic form. (L4)

CO4: Interpret the meaning and **evaluate** gradient of a scalar valued, curl and divergence of vector valued functions. (L5)

CO5: Apply line integrals, surface integrals, volume integrals and their relations using Green's theorem, Stoke's theorem, Gauss Divergence theorems in various engineering applications. (L3)

UNIT-I: Matrix Algebra

Rank of a matrix- Echelon form, Normal Form - Solution of Linear System of Equations - Consistency of Linear System of Equations – Gauss elimination and Gauss Jordan methods, LU Factorization method.

Applications: Finding the current in electrical circuits.

(Sections: 2.7, 2.10, 28.6 of Text Book)

Learning Outcomes:

At the end of the unit, the student will be able to

1. **Find** the rank of a matrix. (L1)
2. **Test for** the consistency and **solve** a system of linear equations. (L4)
3. **Apply** Gauss elimination and Gauss Jordan methods, LU factorization to solve linear systems. (L3)
4. **Determine** unknown currents in electrical circuits. (L5)

UNIT-II: Eigen Values and Eigen Vectors

Eigen Values and Eigen Vectors of a real Matrix – Properties - Cayley- Hamilton theorem (without proof) - Inverse and Powers of a Matrix using Cayley-Hamilton's theorem – Pseudo inverse of a matrix, Singular value decomposition.

(Sections: 2.13 - 2.15 of Text Book)

Learning Outcomes:

At the end of the unit, the student will be able to

1. **Find** eigenvalues and corresponding eigenvectors of a matrix. (L1)
2. **Apply** Cayley-Hamilton theorem to find powers and the inverse of a matrix. (L3)
3. **Calculate** the Pseudo Inverse of a matrix. (L3)
4. Calculate the singular values of a matrix. (L3)

UNIT-III: Quadratic Forms

Inner Product – Orthogonal Vectors – Orthogonal matrix – Diagonalization of a Matrix- Quadratic Forms - Reduction of Quadratic Form to Canonical Form (Orthogonal Transformation) - Nature of a Quadratic Form.

(Sections: 2.16 - 2.18 of Text Book)

Learning Outcomes:

At the end of the unit, the student will be able to

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1. **Make use of** Eigen values and eigen vectors to diagonalize the matrix. (L3)
2. Reduce the Quadratic form to canonical form **examine** the nature of a quadratic form. (L4)

UNIT-IV: Vector Differentiation

Introduction - Scalar and Vector point functions, General rules for vector differentiation - Vector operator ∇ applied to scalar point functions- Gradient, ∇ applied to vector point functions- divergence and curl. Physical interpretation of gradient, divergence and curl (i.e., ∇f, $\nabla.\overline{F}$, $\nabla \times \overline{F}$), Irrotational and Solenoidal fields, Vector Identities.

(Sections: 8.1, 8.4 - 8.9 of Text Book)

Learning Outcomes:

At the end of the unit, the student will be able to

1. **Find** the gradient of a scalar point function, divergence and curl of a vector point function. (L1)
2. **Determine** the directional derivative of scalar point function. (L5)

UNIT-V: Vector Integration

Integration of vectors - Line integral – Circulation - work done - surface integral-flux - Green's theorem in the plane - Stoke's theorem - Volume integral - Gauss Divergence theorem (All theorems without proofs).

(Sections: 8.10 - 8.16, 8.18 of Text Book)

Learning Outcomes:

At the end of the unit, the student will be able to

1. **Determine** the work done in a moving particle along a path. (L5)
2. **Interpret** surface and volume integrals. (L2)
3. **Apply** vector integral theorems to multiple integral. (L3)

Text Books:

B. S. Grewal, Higher Engineering Mathematics, 45th Edition, Khanna Publishers, 2024.

Reference Books:

1. David Poole, Linear Algebra- A modern introduction, 4th edition, 2015.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th edition, John Wiley & Sons, 2011.
3. Peter V. O'Neil, Advanced Engineering Mathematics, 7th edition, Cengage Learning, 2011.
4. Greenberg, Advanced Engineering Mathematics, 2nd Edition, Pearson, 2017.

Web References:

1. https://nptel.ac.in/courses/111107112

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Annexure-8

ANNEXTURE -1

ENGINEERING PHYSICS

I Year B. Tech I Semester (ECE, EEE, CSE [AI&ML])

	L	T	P	C
Course Code:	4	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to:

C01: Apply the principles of interference, diffraction, and polarization in wave optics, and utilize optical instruments for practical applications.
C02: Familiarize the basic concepts of Thermodynamics relevant to engineering applications.
C03: Introduce the knowledge of basic principles of Electromagnetism and EM Waves.
C04: Learn basic principles of lasers, optical fibres and their use in technological applications.
C05: Introduce the basic principles of Quantum mechanics, Quantum computing.

UNIT-I 12 Lectures

Interference: Principle of superposition, Young's Experiment (qualitative treatment), Coherence, Interference in thin films (reflected light), Newton's Rings, Michelson's Interferometer and its applications (thickness of thin sheet, determination of wavelength).

Diffraction: Introduction, Differences between Interference and Diffraction, Differences between Fresnel and Fraunhoffer diffraction, Fraunhoffer diffraction at a single slit (Qualitative and Quantitative treatment)

Polarization: Introduction - types of Polarization. Polarization by reflection, Brewster's law, refraction and double refraction in uniaxial crystals, Nicol Prism, Quarter wave plate and Half wave plate, Applications of Polarization.

Text Book 1: 5.16,5.17,5.18, 5.20, 6.1, 6.2, 6.8.(1-3), 6.11, 6.13, 6.14.1, 6.14.3, 7.1, 7.2, 7.3, 7.4, 7.5, 8.1, 8.2,8.5, 8.6,8.11,8.12, 8.16,8.20.

Learning Outcomes:

At the end of the unit, the student will be able to

1. Understand the principles of interference patterns and apply Michelson's Interferometer to measure physical quantities such as thickness and wavelength (L2)
2. Distinguish between interference and diffraction and perform qualitative and quantitative analysis of Fraunhoffer diffraction at a single slit (L2)
3. Apply polarization concepts through various optical devices to explore and solve problems related to polarized light (L3)

UNIT-II 10 Lectures

Thermodynamics: Heat and Work, First law of thermodynamics and its applications, Reversible and Irreversible process, Carnot cycle and Efficiency, Second law of thermodynamics, Carnot's Theorem, Entropy, Second law in terms of Entropy, Entropy and disorder, Third law of thermodynamics (statement only)

TextBook-1: 16.3,16.5.1,16.6,16.8,16.11,16.12,16.14,16.16,16.17, 16.17.1, 16.18

Learning Outcomes:

At the end of the unit, the student will be able to

1. Apply the first and second laws of thermodynamics to analyse energy transformations and process efficiencies (L3)
2. Understand the Carnot cycle and its efficiency, and calculate entropy changes to explain thermodynamic processes (L2)
3. Differentiate between reversible and irreversible processes, and relate entropy to disorder (L2)
4. State the third law of thermodynamics and understand its implications for materials at absolute zero (L2)

Subject Expert

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UNIT-III 14 Lectures

Electromagnetism: Concept of electric flux, Gauss' law, applications of Gauss' law (wire, sheet, sphere), Magnetic Field, Gauss' law in magnetostatics, Faraday's law of induction, Lenz's law, Induced magnetic fields, Displacement current, Maxwell's equations (no derivation, qualitative treatment), Electromagnetic wave equations, Introduction to EM waves, The Biot-Savart's law, magnetic field near a long wire, magnetic field for a circular Current loop, Ampere's law.
TextBook-1: 2.12,2.14,2.18, 3.5, 3.8, 3.9,3.12, 3.13,3.14, 3.10, 3.12, 3.3,3.4

Learning Outcomes:
At the end of the unit, the student will be able to

1. Apply Gauss's law and Faraday's law of induction to solve problems involving electric and magnetic fields (L3),
2. Use Maxwell's equations to understand electromagnetic wave phenomena (L2).
3. Analyse magnetic fields using Biot-Savart's law, Ampere's law, and apply e magnetostatic field distributions (L3)

UNIT-IV 12 Lectures

Lasers: Characteristics of laser beam, Spontaneous and stimulated emission of radiation, population inversion, Ruby laser, He-Ne laser, Semiconductor laser (homojunction), Applications of lasers.

Optical fibres: principle of propagation of light in optical fibres, Acceptance Angle and cone of a fibre, Numerical aperture, Modes of propagation, Classification of fibres based on refractive index profile and modes, Losses in optical fibres- scattering and bending losses, Fibre optics in communication-Block diagram, Applications of optical fibres
TextBook-1: 24.12, 24.2, 24.5,24.6, 24.7, 24.11.1, 24.11.3, 24.11.5.1, 24.13, 10.2, 10.3, 10.4, 10.5, 10.6, 10.10, 10.11, 10.19,10.20 (only for list of applications)
Learning Outcomes:
At the end of the unit, the student will be able to

1. Understand the principles of laser operation, including spontaneous and stimulated emission, and analyse various types of lasers such as Ruby, He-Ne, and Semiconductor lasers. (L2)
2. Describe the fundamentals of optical fibre technology, including light propagation, acceptance angle, numerical aperture, and classification of fibres (L2)
3. Apply these concepts to fibre optics communication systems and explore their practical applications (L2)

UNIT-V 12 Lectures

Quantum Physics: de Broglie concept of matter waves, Heisenberg's uncertainty principle, Schrödinger time independent wave equation, Physical significance of wave function, particle in a one-dimensional box.

Quantum Computing Quantum bits, Introduction to Pauli spin matrices, Bloch sphere, Entanglement, Qubit Vs classical bit, Single Qubit gates, Quantum Teleportation – Basic Idea.
TextBook-1 20.5, 20.11, 20.17, 20.18, 20.22
Text Book -3 Sec 1.8, 1.9, 1.10.1
Learning Outcomes:
At the end of the unit, the student will be able to

1. Understand the concepts quantum mechanics such as the de Broglie wavelength and Heisenberg's uncertainty principle and use the Schrödinger equation (L2).
2. Describe the fundamentals of quantum computing (L2)

Subject Expert

1.

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Text Books:

1. M. N. Avadhanulu, P. G. Kshirsagar, and T. V. S. Arun Murthy, A textbook of Engineering Physics, 11th edition, S. Chand and Company Ltd., 2019.
2. H. K. Malik and A. K. Singh, Engineering Physics, 2nd Edition, McGraw Hill Education Pvt Ltd. ,2018.
3. P.K. Palanisamy, Engineering Physics, SCITECH Publications, 2011.

Reference Books:

1. Modern Engineering Physics by A.S. Vasudeva S. Chand and Company Ltd., 2010
2. University Physics by Young and Freedman Pearson Education, 2010.
3. Michael A. Nielsen, Isaac L. Chuang, Quantum Computation and Quantum Information Cambridge University Press, 10 th Ed., 2010

Web References:

1. https://nptel.ac.in/courses/115105537 (Wave optics)
2. https://nptel.ac.in/courses/115106122 (Electromagnetism)
3. https://nptel.ac.in/courses/112102255 (Thermodynamics)
4. https://nptel.ac.in/courses/115107095 (Fiber Optics)
5. https://nptel.ac.in/courses/104104085 (Lasers)
6. https://nptel.ac.in/courses/104104082 (Quantum Computing)
7. https://www.intechopen.com/online-first/73811 (Quantum Computing)
8. https://lewisla.gitbook.io/learning-quantum/quantum-circuits/single-qubit-gates (Quantum Computing)
9. https://profmcruz.wordpress.com/wp-content/uploads/2017/08/quantum-computation-and-quantum-information-nielsen-chuang.pdf (Quantum Computing)

Subject Expert

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ANNEXURE 2

ENGINEERING PHYSICS LAB

I Year B. Tech I Semester (ECE, EEE, CSE[AI&ML])

Course Code: **L-T-P-C: 0-0-3-1.5**

Course Objectives:

- To learn the principles of wave optics through experiments
- To learn the basic laws of electromagnetism through study of magnetic field variations
- To learn the calibration process of analog instruments like voltmeter and ammeter
- To learn the usage of semiconductors as sensors in temperature sensing

Course Outcomes

At the end of the course the student will be able to

C01: Interpret the physical parameters based on optical phenomena.
C02: Familiarize with the behaviour of double refraction in birefringent material like quartz.
C03: Understand the concepts of diffraction through experiments.
C04: Calibrate instruments like low range voltmeters and ammeters.
C05: Design temperature sensors based on diodes and thermistors.

List of Experiments:

(Any TEN of the following experiments shall be conducted)

1. Determination of Radius of Curvature of a given Convex Lens By forming Newton's Rings.
2. Determination of Thickness Given Paper Strip or hairline by Wedge Method.
3. Determination of Wavelength of Spectral Lines in the Mercury Spectrum by Normal Incidence method
4. Determination of Cauchy's Constants of a Given Material of the Prism using Spectrometer in minimum deviation position
5. Determination of Refractive Index of Ordinary ray and Extra-ordinary ray in quartz prism
6. Laser- Diffraction – determination of wavelength of laser source using diffraction grating
7. Determination of wavelength of laser source using Fraunhofer single slit diffraction
8. Melde's Apparatus – Frequency of electrically maintained Tuning Fork.
9. Study of Intensity Variation of the Magnetic Field along the axis of circular Current Carrying conductor using Stewart and Gee apparatus
10. Calibration of Low Range Voltmeter using Potentiometer Bridge
11. Calibration of Low Range Ammeter using Potentiometer Bridge
12. Determination of dielectric constant of material using charging discharging method with a parallel plate capacitor
13. Determination of energy band gap of semiconductor using PN junction diode in reverse bias
14. Determination of thermo electric coefficients for thermistor
15. Determination of Planck's constant using LED.

Subject Experts

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Text Books:

1. Practical physics by CL Arora, S.chand publishing company, 1995.
2. Advanced Practical Physics For Students by B.l.worsnop And H.t.flint, 1923

Web References:

1. http://lo-au.vlabs.ac.in/laser-optics/Newtons_Rings_Wavelength_of_light/
2. http://ov-au.vlabs.ac.in/optics/Spectrometer_Refractive_Index/
3. http://ov-au.vlabs.ac.in/optics/Diffraction_Grating/
4. http://htv-au.vlabs.ac.in/heat-thermodynamics/Characteristics_of_Thermistor/
5. https://bop-iitk.vlabs.ac.in/exp/energy-band-gap/simulation.html

Subject Experts

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ANNEXTURE -3

ENGINEERING PHYSICS
I Year B. Tech II Semester (CSE & IT)

Course Code:	L	T	P	C
	4	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to:

C01: Apply the principles of interference, diffraction, and polarization in wave optics, and utilize optical instruments for practical applications.
C02: Familiarize the basic concepts of Thermodynamics relevant to engineering applications.
C03: Introduce the knowledge of basic principles of Electromagnetism and EM Waves.
C04: Learn basic principles of lasers, optical fibres and their use in technological applications.
C05: Introduce the basic principles of Quantum mechanics, Quantum computing.

UNIT-I 12 Lectures

Interference: Principle of superposition, Young's Experiment (qualitative treatment), Coherence, Interference in thin films (reflected light), Newton's Rings, Michelson's Interferometer and its applications (thickness of thin sheet, determination of wavelength).
Diffraction: Introduction, Differences between Interference and Diffraction, Differences between Fresnel and Fraunhoffer diffraction, Fraunhoffer diffraction at a single slit (Qualitative and Quantitative treatment)
Polarization: Introduction - types of Polarization, Polarization by reflection, Brewster's law, refraction and double refraction in uniaxial crystals, Nicol Prism, Quarter wave plate and Half wave plate, circular and elliptical polarization – conversion, Applications of Polarization.
Text Book 1: 5.16,5.17,5.18, 5.20, 6.1, 6.2, 6.8.(1-3), 6.11, 6.13, 6.14.1, 6.14.3, 7.1, 7.2, 7.3, 7.4, 7.5, 8.1, 8.2,8.5, 8.6,8.11,8.12, 8.16,8.20.
Learning Outcomes:
At the end of the unit, the student will be able to

1. Understand the principles of interference patterns and apply Michelson's Interferometer to measure physical quantities such as thickness and wavelength (L2)
2. Distinguish between interference and diffraction and perform qualitative and quantitative analysis of Fraunhoffer diffraction at a single slit (L2)
3. Apply polarization concepts through various optical devices to explore and solve problems related to polarized light (L3)

UNIT-II 10 Lectures

Thermodynamics: Heat and Work, First law of thermodynamics and its applications, Reversible and Irreversible process, Carnot cycle and Efficiency, Second law of thermodynamics, Carnot's Theorem, Entropy, Second law in terms of Entropy, Entropy and disorder, Third law of thermodynamics (statement only)
TextBook-1: 16.3,16.5.1,16.6,16.8,16.11,16.12,16.14,16.16,16.17, 16.17.1, 16.18
Learning Outcomes:
At the end of the unit, the student will be able to

1. Apply the first and second laws of thermodynamics to analyse energy transformations and process efficiencies (L3)
2. Understand the Carnot cycle and its efficiency, and calculate entropy changes to explain thermodynamic processes (L2)
3. Differentiate between reversible and irreversible processes, and relate entropy to disorder (L2)
4. State the third law of thermodynamics and understand its implications for materials at absolute zero (L2)

Subject Expert

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UNIT-III 14 Lectures

Electromagnetism: Concept of electric flux, Gauss' law, applications of Gauss' law (wire, sheet, sphere), Magnetic Field, Gauss' law in magnetostatics, Faraday's law of induction, Lenz's law, Induced magnetic fields, Displacement current, Maxwell's equations (no derivation, qualitative treatment), Electromagnetic wave equations, Introduction to EM waves, The Biot-Savart's law, magnetic field near a long wire, magnetic field for a circular Current loop, Ampere's law.

TextBook-1: 2.12,2.14,2.18, 3.5, 3.8, 3.9,3.12, 3.13,3.14, 3.10, 3.12, 3.3,3.4

Learning Outcomes:

At the end of the unit, the student will be able to

4. Apply Gauss's law and Faraday's law of induction to solve problems involving electric and magnetic fields (L3),
5. Use Maxwell's equations to understand electromagnetic wave phenomena (L2).
6. Analyse magnetic fields using Biot-Savart's law, Ampere's law, and apply e magnetostatic field distributions (L3)

UNIT-IV 12 Lectures

Lasers: Characteristics of laser beam, Spontaneous and stimulated emission of radiation, population inversion, Ruby laser, He-Ne laser, Semiconductor laser (homojunction), Applications of lasers.

Optical fibres: principle of propagation of light in optical fibres, Acceptance Angle and cone of a fibre, Numerical aperture, Modes of propagation, Classification of fibres based on refractive index profile and modes, Losses in optical fibres- scattering and bending losses, Fibre optics in communication-Block diagram, Applications of optical fibres

TextBook-1: 24.12, 24.2, 24.5,24.6, 24.7, 24.11.1, 24.11.3, 24.11.5.1, 24.13, 10.2, 10.3, 10.4, 10.5, 10.6, 10.10, 10.11, 10.19,10.20 (only for list of applications)

Learning Outcomes:

At the end of the unit, the student will be able to

1. Understand the principles of laser operation, including spontaneous and stimulated emission, and analyse various types of lasers such as Ruby, He-Ne, and Semiconductor lasers. (L2)
2. Describe the fundamentals of optical fibre technology, including light propagation, acceptance angle, numerical aperture, and classification of fibres (L2)
3. Apply these concepts to fibre optics communication systems and explore their practical applications (L2)

UNIT-V 12 Lectures

Quantum Physics: de Broglie concept of matter waves, Heisenberg's uncertainty principle, Schrödinger time independent wave equation, Physical significance of wave function, particle in a one-dimensional box.

Quantum Computing Quantum bits, Introduction to Pauli spin matrices, Bloch sphere, Entanglement, Qubit Vs classical bit, Single Qubit gates, Quantum Teleportation – Basic Idea.

TextBook-1 20.5, 20.11, 20.17, 20.18, 20.22

Text Book -3 Sec 1.8, 1.9, 1.10.1

Learning Outcomes:

At the end of the unit, the student will be able to

1. Understand the concepts quantum mechanics such as the de Broglie wavelength and Heisenberg's uncertainty principle and use the Schrödinger equation (L2).
2. Describe the fundamentals of quantum computing (L2)

Subject Expert

1.

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Text Books:

1. M. N. Avadhanulu, P. G. Khirsagar, and T. V. S. Arun Murthy, A textbook of Engineering Physics, 11th edition, S. Chand and Company Ltd., 2019.
2. H. K. Malik and A. K. Singh, Engineering Physics, 2nd Edition, McGraw Hill Education Pvt Ltd. ,2018.
3. P.K. Palaniswamy, Engineering Physics, SCITECH Publications, 2011.

Reference Books:

4. Modern Engineering Physics by A.S. Vasudeva S. Chand and Company Ltd., 2010
5. University Physics by Young and Freedman Pearson Education, 2010.
6. Michael A. Nielsen, Isaac L. Chuang, Quantum Computation and Quantum Information Cambridge University Press, 10 th Ed., 2010

Web References:

1. https://nptel.ac.in/courses/115105537 (Wave optics)
2. https://nptel.ac.in/courses/115106122 (Electromagnetism)
3. https://nptel.ac.in/courses/112102255 (Thermodynamics)
4. https://nptel.ac.in/courses/115107095 (Fiber Optics)
5. https://nptel.ac.in/courses/104104085 (Lasers)
6. https://nptel.ac.in/courses/104104082 (Quantum Computing)
7. https://www.intechopen.com/online-first/73811 (Quantum Computing)
8. https://lewisla.gitbook.io/learning-quantum/quantum-circuits/single-qubit-gates (Quantum Computing)
9. https://profmcruz.wordpress.com/wp-content/uploads/2017/08/quantum-computation-and-quantum-information-nielsen-chuang.pdf (Quantum Computing)

Subject Expert

1. Head
Department of physics
Andhra University
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Chairperson (BoS)

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ANNEXURE 4

ENGINEERING PHYSICS LAB

I Year B. Tech I Semester (CSE &IT)

Course Code: **L-T-P-C: 0-0-3-1.5**

Course Objectives:

- To learn the principles of wave optics through experiments
- To learn the basic laws of electromagnetism through study of magnetic field variations
- To learn the calibration process of analog instruments like voltmeter and ammeter
- To learn the usage of semiconductors as sensors in temperature sensing

Course Outcomes

At the end of the course the student will be able to

C01: Interpret the physical parameters based on optical phenomena
C02: Familiarize with the behaviour of double refraction in birefringent material like quartz
C03: Understand the concepts of diffraction through experiments
C04: Calibrate instruments like low range voltmeters and ammeters
C05: Design temperature sensors based on diodes and thermistors

List of Experiments:

(Any TEN of the following experiments shall be conducted)

1. Determination of Radius of Curvature of a given Convex Lens By forming Newton's Rings.
2. Determination of Thickness Given Paper Strip or hairline by Wedge Method.
3. Determination of Wavelength of Spectral Lines in the Mercury Spectrum by Normal Incidence method
4. Determination of Cauchy's Constants of a Given Material of the Prism using Spectrometer in minimum deviation position
5. Determination of Refractive Index of Ordinary ray and Extra-ordinary ray in quartz prism
6. Laser- Diffraction – determination of wavelength of laser source using diffraction grating
7. Determination of wavelength of laser source using Fraunhofer single slit diffraction
8. Melde's Apparatus – Frequency of electrically maintained Tuning Fork.
9. Study of Intensity Variation of the Magnetic Field along the axis of circular Current Carrying conductor using Stewart and Gee apparatus
10. Calibration of Low Range Voltmeter using Potentiometer Bridge
11. Calibration of Low Range Ammeter using Potentiometer Bridge
12. Determination of dielectric constant of material using charging discharging method with a parallel plate capacitor
13. Determination of energy band gap of semiconductor using PN junction diode in reverse bias
14. Determination of thermo electric coefficients for thermistor
15. Determination of Planck's constant using LED.

Subject Expert

1.

Head
Department of physics
Andhra University
VISAKHAPATNAM-530 003

Chairperson (BoS)

Text Books:

1. Practical physics by CL Arora, S.chand publishing company, 1995.
2. Advanced Practical Physics For Students by B.l.worsnop And H.t.flint, 1923

Web References:

1. http://lo-au.vlabs.ac.in/laser-optics/Newtons_Rings_Wavelength_of_light/
2. http://ov-au.vlabs.ac.in/optics/Spectrometer_Refractive_Index/
3. http://ov-au.vlabs.ac.in/optics/Diffraction_Grating/
4. http://htv-au.vlabs.ac.in/heat-thermodynamics/Characteristics_of_Thermistor/
5. https://bop-iitk.vlabs.ac.in/exp/energy-band-gap/simulation.html

Subject Expert

1.

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Department of physics
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VISAKHAPATNAM-530 003

Chairperson (BoS)

Annexure-9

Annexure-1

GREEN-CHEMISTRY

I Year B. Tech I-Semester (EEE,CSE&IT)

L-T-P-C: 4-0-0-3

Course Outcomes: At the end of the Course, the student shall be able to

C01: To develop the knowledge about water and its treatment for industrial and potablepurpose(L-3)

C02: Utilize the theory of construction and discharge reactions of various types of batteries areused in commercial society (L-3)

C03: Explain the importance of working principle, fabrication of electrodes and other components, advantages, disadvantages and environmental aspects of fuel cells(L-4)

C04: Classify the corrosion mechanism of metals and factors influenced by rate and extent ofcorrosion and categorize the reasons for corrosion control methods(L-4)

C05: Apply green chemistry technology processes the knowledge for solving existing challengesfaced in various engineering and societal areas (L-5)

UNIT-I WATER-TECHNOLOGY **12hrs**

Sources of Water – Impurities and their influence of living systems – WHO Limits – Hardness and its Determination – Boiler Troubles and their removal – Water Softening Methods – Lime-Soda, Zeolite and Ion Exchange - Municipal Water Treatment-Break Point Chlorination – Desalination of Sea Water –Reverse Osmosis Method Electro-dialysis. Chemical analysis of water

Engineering Chemistry – PC Jain and M. Jain – 15 Edition; Dhanpath Rai and Sons New Delhi

Learning Outcomes:

At the end of the unit the student will be able to

- Explain the principles of reverse osmosis (L-4)
- Compare the quality of drinking water with BIS and WHO standards (L-4)
- Illustrate problems associated with Boiler Troubles (L-2)
- Demonstrate the estimation of hardness of water (L-3)

UNIT-II BATTERIES **12 hrs**

Primary batteries: The chemistry-Types: Zinc-carbon (Leclanche type), zinc alkaline (Duracell), zinc/air batteries; Lithium primary cells and lithium-ferrous sulphide cells. Secondary batteries: Leadacid and VRLA (valve regulated (sealed) lead acid), nickel cadmium, nickel-zinc, nickel-metal hydridebatteries, lithium ion batteries, ultrathin lithium polymer cells. Advanced Batteries for electric vehicles,requirements of the battery – sodium-beta and redox batteries.

Engineering Chemistry – PC Jain and M. Jain – 15 Edition; Dhanpath Rai and Sons New Delhi

Learning Outcomes:

At the end of the unit, the student will be able to

- Deduct the working mechanism of various types of cells (L-5)
- Illustrate difference between primary and secondary cells (L-2)
- List the environmental applications of Various types of batteries (L-4)
- Utilize the manufacturing methods of advanced batteries for electric vehicles (L-3)

UNIT-III FUEL CELLS **10 Hrs.**

Fuel Cells: Description, working principle, anodic, cathodic and cell reactions, fabrication of electrodes and other components, applications, advantages, disadvantages and environmental aspects of the following types of fuel cells: Proton Exchange Membrane Fuel Cells, alkaline fuel cells, phosphoric acid, solid oxide, molten carbonate, direct methanol fuel cells- Membranes and Fuels, Electrochemical Sensors and Optical fibres

1.Engineering Chemistry – PC Jain and M. Jain – 15 Edition; Dhanpath Rai and Sons, New Delhi

2.M. Aulice Scibioh and B. Viswanathan 'Fuel Cells – principles and applications', University Press, India (2006).

Subject Experts

(1) Basavaiah

Prof. (Dr) K. BASAVAIAH
Organic & Analytical Chemistry
School of Chemistry
A.U. College of Science & Technology
Andhra University
Visakhapatnam

Chairperson BOS

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Learning Outcomes:

At the end of the unit, the student will be able to

- Explain the fundamental theories of fuel cells (L-2)
- Classify types of fuel cells (L-4)
- Make use of the various components fabrication of fuel cells (L-3)
- Distinguish the advantages, disadvantages and environmental aspects of fuel cells(L-4)

UNIT-IV CORROSION **12 hrs**

Corrosion: Origin and Theory – Types of Corrosion: Chemical and Electrochemical; Pitting, Inter granular; Waterline, Stress – Galvanic Series – Factors Effecting Corrosion. Corrosion Controlling Methods, Protective Coatings, Electroplating and Electroless Plating, Paints, Varnishes, Lacquers, Enamels

Engineering Chemistry – PC Jain and M. Jain – 15 Edition; Dhanpath Rai and Sons, New Delhi

Learning Outcomes:

At the end of the unit, the student will be able to

- Explain the Mechanism of corrosion (L-4)
- List the various types of Corrosion (L-4)
- Describe the Factors Effecting Corrosion (L-5)
- Differentiate between Paints Lacquers Enamels (L-4)

UNIT-V GREEN-CHEMISTRY AND TECHNOLOGY **12 hrs**

Introduction and significance of green chemistry, Goals of green chemistry, 12 principles of green chemistry, toxicity of chemicals, concept of zero pollution technologies; Aqueous phase method, Super critical fluid method, Phase transfer catalytic method, atom economy, functional toxicity vs non-functional toxicity, functional group approaches to green chemistry, Elimination of toxic functionalgroup, optimization of frameworks for the design of greener synthetic pathways -Green synthesis of Adipic acid and Paracetamol- energy minimization-Microwave synthesis, ultra sound assisted methodBio catalysed reaction and Only explanation with examples Processes involving solid catalysts – zeolites, ion exchange resins,applications of Green Chemistry, Green solvents, green fuels & propellants

Anastas, P. T., Warner, J. C. Green Chemistry: Theory and Practice, Oxford University Press Inc., New York, 1998

Learning Outcomes:

At the end of the unit the student will be able to

Text Books:

1. Engineering Chemistry – PC Jain and M. Jain – Dhanpath Rai and Sons, New Delhi.
2. Anastas, P. T., Warner, J. C. Green Chemistry: Theory and Practice, Oxford UniversityPress Inc., New York, 1998

Reference Books:

1. M. Aulice Scibioh and B. Viswanathan 'Fuel Cells – principles and applications', University Press India (2006).
2. A Text book of Engineering Chemistry – S. S. Dara – S. Chand & Co. New Delhi
3. Hand Book of Green Chemistry and Technology; by James Clarke and Duncan Macquarrie; Blakwell Publishing

. Web References:

1. https://archive.nptel.ac.in/course.html
2. https://nptel.ac.in/courses/engineering chemistry

. Subject Experts

(1)

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Annexure-2

GREEN-CHEMISTRY –LAB

I Year B. Tech I Semester (EEE)

L	T	P	C
0	0	3	1.5

CO-1 (Exp-1 &2)	**Make use of** experimental skills for quantitatively with accuracy analysis in acid-base titrations using suitable indicators
CO-2 (Exp-3 7, 9,10 & 11)	**Apply** the principals of redox titrations Chromium (VI) by Mohr's Salt Solution in different samples
CO-3 (Exp-4)	**Utilize** with complex metric titrations to determine hardness of water and estimate the amount of impurities present in the samples
CO-4 (Exp-5 & 8)	Perform **experiments with** instrument novel materials to be used as zeolite for removal of hardness of water to acquire skills of different methods of chemical analysis
CO-5 (Exp--6)	The students to **develop** the skills of green synthesis through the preparation of a polymer/ drug

S.NO.	TITLE OF THE EXPERIMENTS
1	Determination of Sodium Hydroxide with HCl (Na_2CO_3)Primary Standard)
2	Determination of Alkalinity (Carbonate and Hydroxide) of water sample
3	Determination of Chromium (VI) by Mohr's Salt Solution
4	Determination of Hardness of Water sample by EDTA method
5	Zeolite column for removal of hardness of water/ Ion exchange-Method
6	Green Synthesis of Polymer/ drug
7	Determination of Oxalic Acid by Permanganometry
8	Determination of the concentration of strong acid vs strong base (by conductometric method)
9	Determination of Fe(II)/Mohr's Salt by Potassium dichromate (by redox-method)
10	Determination of Cu^{+2}using standard hypo solution (Iodometry)
11	Estimation of chorine by using bleaching powder
12	Estimation of vitamin-C

Of the above experiments at-least 10 assessment experiments should be completed in a semester.

Text Books: 1. Vogel's Quantitative Chemical Analysis – V – Edition – Longman.

2. Experiments in Applied Chemistry (For Engineering Students) – Sirita Rattan – S. K. Kataria & Sons, New Delhi

Course Objectives:

To develop the fine skills of quantitative determination of various chemical components through titrimetric analysis

- To prepare and use ion exchange / zeolite columns for the removal of hardness of water
- To develop the skill of organic synthesis through the preparation of a polymer/ drug

Outcomes: The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis.

Subject Experts

(1)

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Annexure-3

GREEN-CHEMISTRY

I Year B. Tech II- Semester CSE-(AI&ML)&ECE

L-T-P-C: 4-0-0-3

Course Outcomes: At the end of the Course, the student shall be able to

C01: To develop the knowledge about water and its treatment for industrial and potablepurpose(L-3)

C02: Utilize the theory of construction and discharge reactions of various types of batteries areused in commercial society (L-3)

C03: Explain the importance of working principle, fabrication of electrodes and other components, advantages, disadvantages and environmental aspects of fuel cells(L-4)

C04: Classify the corrosion mechanism of metals and factors influenced by rate and extent ofcorrosion and categorize the reasons for corrosion control methods(L-4)

C05: Apply green chemistry technology processes the knowledge for solving existing challengesfaced in various engineering and societal areas (L-5)

UNIT-I WATER-TECHNOLOG **12hrs**

Sources of Water – Impurities and their influence of living systems – WHO Limits – Hardness and its Determination – Boiler Troubles and their removal – Water Softening Methods – Lime-Soda, Zeolite and Ion Exchange - Municipal Water Treatment-Break Point Chlorination – Desalination of Sea Water –Reverse Osmosis Method Electro-dialysis. Chemical analysis of water

Engineering Chemistry – PC Jain and M. Jain – 15 Edition; Dhanpath Rai and Sons New Delhi

Learning Outcomes:

At the end of the unit the student will be able to

- Explain the principles of reverse osmosis (L-4)
- Compare the quality of drinking water with BIS and WHO standards (L-4)
- Illustrate problems associated with Boiler Troubles (L-2)
- Demonstrate the estimation of hardness of water (L-3)

UNIT-II BATTERIES **12 hrs**

Primary batteries: The chemistry-Types: Zinc-carbon (Leclanche type), zinc alkaline (Duracell), zinc/air batteries; Lithium primary cells and lithium-ferrous sulphide cells. Secondary batteries: Leadacid and VRLA (valve regulated (sealed) lead acid), nickel cadmium, nickel-zinc, nickel-metal hydridebatteries, lithium ion batteries, ultrathin lithium polymer cells. Advanced Batteries for electric vehicles,requirements of the battery – sodium-beta and redox batteries.

Engineering Chemistry – PC Jain and M. Jain – 15 Edition; Dhanpath Rai and Sons New Delhi

Learning Outcomes:

At the end of the unit, the student will be able to

- Deduct the working mechanism of various types of cells (L-5)
- Illustrate difference between primary and secondary cells (L-2)
- List the environmental applications of Various types of batteries (L-4)
- Utilize the manufacturing methods of advanced batteries for electric vehicles (L-3)

UNIT-III FUEL CELLS **10 Hrs.**

Fuel Cells: Description, working principle, anodic, cathodic and cell reactions, fabrication of electrodes and other components, applications, advantages, disadvantages and environmental aspects of the following types of fuel cells: Proton Exchange Membrane Fuel Cells, alkaline fuel cells, phosphoric acid, solid oxide, molten carbonate, direct methanol fuel cells- Membranes and Fuels, Electrochemical Sensors and Optical fibres

Subject Experts

(1) B. Basavaiah

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Department of Inorganic & Analytical Chemistry
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1.Engineering Chemistry – PC Jain and M. Jain – 15 Edition; Dhanpath Rai and Sons, New Delhi
2.M. Aulice Scibioh and B. Viswanathan 'Fuel Cells – principles and applications', University Press, India (2006).

Learning Outcomes:

At the end of the unit, the student will be able to

- Explain the fundamental theories of fuel cells (L-2)
- Classify types of fuel cells (L-4)
- Make use of the various components fabrication of fuel cells (L-3)
- Distinguish the advantages, disadvantages and environmental aspects of fuel cells(L-4)

UNIT-IV CORROSION **12 hrs**

Corrosion: Origin and Theory – Types of Corrosion: Chemical and Electrochemical; Pitting, Inter granular, Waterline, Stress – Galvanic Series – Factors Effecting Corrosion. Corrosion Controlling Methods, Protective Coatings, Electroplating and Electroless Plating, Paints, Varnishes, Lacquers, Enamels

Engineering Chemistry – PC Jain and M. Jain – 15 Edition; Dhanpath Rai and Sons, New Delhi

Learning Outcomes:

At the end of the unit, the student will be able to

- Explain the Mechanism of corrosion (L-4)
- List the various types of Corrosion (L-4)
- Describe the Factors Effecting Corrosion (L-5)
- Differentiate between Paints Lacquers Enamels (L-4)

UNIT-V GREEN-CHEMISTRY AND TECHNOLOGY **12 hrs**

Introduction and significance of green chemistry, Goals of green chemistry, 12 principles of green chemistry, toxicity of chemicals, concept of zero pollution technologies; Aqueous phase method, Supercritical fluid method, Phase transfer catalytic method, atom economy, functional toxicity vs non- functional toxicity, functional group approaches to green chemistry, Elimination of toxic functional group, optimization of frameworks for the design of greener synthetic pathways -Green synthesis ofAdipic acid and Paracetamol- energy minimization-Microwave synthesis, ultra sound assisted method Bio catalysed reaction and Only explanation with examples Processes involving solid catalysts – zeolites, ion exchange resins,applications of Green Chemistry, Green solvents, green fuels & propellants

Anastas, P. T., Warner, J. C. Green Chemistry: Theory and Practice, Oxford University Press Inc., New York, 1998

Learning Outcomes:

At the end of the unit the student will be able to

Text Books:

3. Engineering Chemistry – PC Jain and M. Jain – Dhanpath Rai and Sons, New Delhi.
4. Anastas, P. T., Warner, J. C. Green Chemistry: Theory and Practice, Oxford UniversityPress Inc., New York, 1998

Reference Books:

4. M. Aulice Scibioh and B. Viswanathan 'Fuel Cells – principles and applications', University Press India (2006).
5. A Text book of Engineering Chemistry – S. S. Dara – S. Chand & Co. New Delhi
6. Hand Book of Green Chemistry and Technology; by James Clarke and Duncan Macquarrie; Blakwell Publishing

. **Web References:**

1. https://archive.nptel.ac.in/course.html
2. https://nptel.ac.in/courses/engineering chemistry

Subject Experts

(1). Basavaiah

Prof. (DR) K. BASAVAIAH
Department of Inorganic & Analytical Chemistry
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Andhra University
Visakhapatnam

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ADHURAWADA VISAKHAPATNAM-530 048

Annexure-10

ENGLISH

I Year B. Tech I Semester

(Common to the branches: CSE, IT)

ANNEXURE-I

Course Code: **L-T-P-C: 4-0-0-3**

Course Outcomes: At the end of the Course, the student shall be able to

C01: **Develop** ethical and moral values, **Practice** inner peace, **Demonstrate** the use of LSRW skills, Vocabulary and basic grammar concepts.(L3)

C02: **Assess** the impact of different social backgrounds, **critique** the poet's insights. (L5) **Demonstrate** the use of LSRW skills, Vocabulary and basic grammar concepts.(L3)

C03: **Analyse** socio-cultural context(L4), **Establish** effective interpersonal and communication skills(L3), **Demonstrate** the use of LSRW skills, Vocabulary and basic grammar concepts(L3)

C04: **Focus** on value of education, **Relate** to the poet's nostalgia, **Demonstrate** the use of LSRW skills, Vocabulary and basic grammar concepts (L4,L3)

C05: **Determine** the central idea of the text, **Identify** one's resilience, **Demonstrate** the use of LSRW skills, Vocabulary and basic grammar concepts (L3)

UNIT-I 12 Lectures

Prose: Swami Vivekananda: The Secret of Work
Poetry: Grenville Kleiser: Stay Calm
Grammar & Vocabulary: Synonyms & Antonyms
Listening: Listening for Context and Specific Information
Speaking: Introducing Oneself and Others
Writing: Basics of writing

Learning Outcomes:

At the end of the unit, the student will be able to

1. **Focus & Interpret** on the spiritual growth and capacity building of the individual in the 21st century.(L4,L3)
2. **Improve** communication with appropriate synonyms and antonyms. (L6)
3. Listen and **understand** for specific information in the audio(L2)
4. **Establish** connections between oneself and others(L3)
5. **Apply** appropriate punctuation marks for clarity and organisation of written text (L3)

Subject Experts:

1. G. Lavanya Laasya
2. N.S. Perry
3. Chandrani Mukherjee.

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UNIT-II 12 Lectures

Prose: Katherine Mansfield: The Doll's House
Poetry: Rabindranath Tagore: Where the Mind Is Without Fear
Grammar & Vocabulary : Phrasal Verbs
Listening: Listening for Main Idea and Supporting Ideas
Speaking: Getting Someone's Attention and Interrupting
Writing: Formal Letters
Learning Outcomes:
At the end of the unit, the student will be able to

1. **Understand** the world through adult & child's points of view (L2)
2. **Perceive** a sense of self dignity & rationality(L5)
3. **Utilize** appropriate phrasal verbs for effective communication(L3)
4. Listen **& Identify** main and supporting ideas in the audio(L3)
5. **Practice** conversational etiquette(L3)
6. **Compose** formal letters(L6)

UNIT-III 12 Lectures

Prose: O. Henry: The Last Leaf
Poetry: Rudyard Kipling: If
Grammar & Vocabulary: Idiomatic Expressions
Listening: Listening for Global Comprehension
Speaking: Asking for Information and Giving Information
Writing: Note-Making
Learning Outcomes:
At the end of the unit, the student will be able to:

1. **Develop** strategies to face challenges in life effectively(L6)
2. **Make use of** idiomatic expressions in oral & written communication(L3)
3. Listen & **Analyse** the audio for Global Comprehension(L4)
4. **Ask** & give information(L2)
5. **Practice** note making study skills(L3)

Subject Experts:

1. G. Suresha Reddy
2. N.S. Berry
3. Chandrasekhar

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GVP COLLEGE OF ENGINEERING FOR WOMEN
MADHURAWADA VISAKHAPATNAM-530 048

UNIT-III 12 Lectures

Prose: O. Henry: The Last Leaf
Poetry: Rudyard Kipling: If
Grammar & Vocabulary: Idiomatic Expressions
Listening: Listening for Global Comprehension
Speaking: Asking for Information and Giving Information
Writing: Note-Making
Learning Outcomes:
At the end of the unit, the student will be able to:

6. **Develop** strategies to face challenges in life effectively(L6)
7. **Make use of** idiomatic expressions in oral & written communication(L3)
8. Listen & **Analyse** the audio for Global Comprehension(L4)
9. **Ask** & give information(L2)
10. **Practice** note making study skills(L3)

UNIT-IV 12 Lectures

Prose: Francis Bacon: Of Studies
Poetry: Toru Dutt: Our Casuarina Tree
Grammar & Vocabulary : Remedial Grammar I
Listening: Listening to Make Inferences
Speaking: Expressing Opinions, and Agreeing and Disagreeing with Opinions
Writing: Essay Writing
Learning Outcomes:
At the end of the unit, the student will be able to

1. **Develop** the habits of continuous learning(L6)
2. **Use** of Indian philosophy as a way of life(L3)
3. **Identify** and correct common errors in English grammar and usage(L3)
4. **Make inferences** from the audio(L4)
5. **Express** opinions(L6)
6. **Compose** different types of essays(DEAN)(L6)

Subject Experts:

1. G. Suvarnalatha
2. M.S. Berry
3. Chandrika

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ADHURAWADA VISAKHAPATNAM-530 040

UNIT-V 12 Lectures

Prose: Mark Twain: Whitewashing the Fence
Poetry: William Ernest Henley: Invictus
Grammar & Vocabulary : Remedial Grammar II
Listening: Listening for Key Ideas
Speaking: Telephone Etiquette
Writing: E-mail Etiquette

Learning Outcomes:
At the end of the unit, the student will be able to

1. **Discover** the humour& moral lessons in the text(L3)
2. **Adapt** to adverse situations.(L6)
3. **Find errors** in grammar ,vocabulary and usage(L5)
4. **Prioritize** key ideas(L5)
5. **Practise** telephone Etiquette(L3)
6. **Compose** E-Mails(L6)

Text Books:

1. **English for Engineers: Theory to practice**. Board of Editors, Orient Black Swan Publishers, India.2024.

Reference Books:

1. English Grammar in Use by Raymond Murphy
2. Oxford English Grammar Course by Michael Swan
3. Word Power Made Easy by Norman Lewis
4. Cambridge Vocabulary for IELTS by Pauline Cullen
5. The Elements of Style by William Strunk Jr. and E.B. White
6. English Vocabulary in Use by Michael McCarthy and Felicity O'Dell
7. Practical English Usage by Michael Swan
8. The Only Grammar Book You'll Ever Need by Susan Thurman
9. Advanced English Grammar: A Linguistic Approach by Ilse Depraetere and Chad Langford

Subject Experts:

1. G. Sumana Lakshmi
2. M.S. Berry
3. Chandrasekhar.

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COMMUNICATION SKILLS LAB

I Year B. Tech. I Semester

(Common to the branches: CSE & IT)

ANNEXURE-II

Course Code: **L-T-P-C: 0-0-3-1.5**

Course Outcomes: At the end of the Course, the student shall be able to

C01: **Identify** and pronounce the sounds of English; **choose** the accurate stress in connected speech for proper intonation (L2,L3) [Exp 1,2]

C02: **Identify** the main theme and ideas to **Summarize** audio texts(L2,L5) [Exp 3,4]

C03: **Take part in** Just A Minute (JAM) – Picture Prompts- Narratives-Role Play (L4) [Exp 5,6,7,8]

C04: **Practice** discussions and debates(L3) [Exp 9,10]

C05: **Demonstrate** Presentation Skills(L3) [Exp 11,12]

UNIT-I

Introduction to Phonetics: The Sounds of English (Speech sound – vowels and consonants) - Stress and Intonation - Accent and Rhythm.

Learning Outcomes:

At the end of the unit, the student will be able to

1. **Apply** the phonetic symbols for better pronunciation. (L3)
2. **Choose** appropriate stress, intonation and rhythm of English language for clear communication. (L3)
3. **Improve** student's articulation. (L6)

UNIT-II

Listening Skills: Listening for gist and specific information - listening for Note taking, Summarizing and for opinions - Listening to the speeches of eminent personalities.

Learning Outcomes:

At the end of the unit, the student will be able to

1. **Develop** effective listening skills for better comprehension of academic lectures and English spoken by native speakers (L6).
2. **Apply** effective strategies for good writing (L3)
3. **Demonstrate** writing skills in note taking and summarizing(L3)

Subject Experts:

1. G. Lavanya Lakshmi
2. N.S. Reddy
3. Chandrasekhar

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UNIT-III

Speaking Skills:Just A Minute (JAM) session –Picture Prompts- Narrating stories and anecdotes-Role Play

Learning Outcomes:

At the end of the unit, the student will be able to

1. **Make** use of dialogues for different roles. (L3)
2. **Develop** communication skills in formal and informal situations. (L3)
3. **Improve** speaking skills through participation in activities such as narrating stories and role plays(L6)

UNIT-IV

Speaking skills: Group Discussions-Arguments-Debates

Learning Outcomes:

At the end of the unit, the student will be able to

1. **Focus** on discussions in various formats(L4)
2. **Develop** ideas and arguments to debate.(L3)

UNIT-V

Presentation skills: Verbal and non-verbal communication - Body Language - Making a Presentation

Learning Outcomes:

At the end of the unit, the student will be able to

1. **Design** presentations with PowerPoint slides(L3)
2. **Adapt** postures, gestures, facial expressions and eye contact in formal presentations. (L6)

Reference Books:

1. Language and Life: A Skills Approach Board of Editors, Orient Black swan Publishers, India.2018.
2. A Textbook of English Phonetics for Indian Students, T.Balasubramanian, Macmillan India Ltd.
3. Ashraf Rizvi. Effective Technical Communication. Tata McGraw Hill Education Private Limited, New Delhi.
4. Speak Well. Orient Black swan Publishers, Hyderabad.
5. Allan Pease. Body Language. Manjul Publishing House, New Delhi.

Subject Experts:

1. G. Swaminathan
2. H.S. Berry
3. Chandrika

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Web References:

1. https://www.englishlanguageclub.co.uk
2. https://www.ted.ed.com/
3. https://learningenglish.voanews.com/
4. https://www.bbc.co.uk/learningenglish/
5. https://www.abc.net.au/education/learn-english
6. NDTV News

Subject Experts:

1. G. Lavanya Latha
2. N.S. Berry
3. Chandrashekhar

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ENGLISH

I Year B. Tech II Semester

(Common to the branches: ECE,EEE&CSM)

ANNEXURE-III

Course Code: **L-T-P-C: 4-0-0-3**

Course Outcomes: At the end of the Course, the student shall be able to

C01: **Develop** ethical and moral values, **Practice** inner peace, **Demonstrate** the use of LSRW skills, Vocabulary and basic grammar concepts.(L3)

C02: **Assess** the impact of different social backgrounds, **critique** the poet's insights. (L5) **Demonstrate** the use of LSRW skills, Vocabulary and basic grammar concepts.(L3)

C03: **Analyse** socio-cultural context(L4), **Establish** effective interpersonal and communication skills(L3), **Demonstrate** the use of LSRW skills, Vocabulary and basic grammar concepts(L3)

C04: **Focus** on value of education, **Relate** to the poet's nostalgia, **Demonstrate** the use of LSRW skills, Vocabulary and basic grammar concepts (L4,L3)

C05: **Determine** the central idea of the text, **Identify** one's resilience, **Demonstrate** the use of LSRW skills, Vocabulary and basic grammar concepts (L3)

UNIT-I 12 Lectures

Prose: Swami Vivekananda: The Secret of Work
Poetry: Grenville Kleiser: Stay Calm
Grammar & Vocabulary: Synonyms & Antonyms
Listening: Listening for Context and Specific Information
Speaking: Introducing Oneself and Others
Writing: Basics of writing
Learning Outcomes:
At the end of the unit, the student will be able to

1. **Focus & Interpret** on the spiritual growth and capacity building of the individual in the 21st century.(L4,L3)
2. **Improve** communication with appropriate synonyms and antonyms. (L6)
3. Listen and **understand** for specific information in the audio(L2)
4. **Establish** connections between oneself and others(L3)
5. **Apply** appropriate punctuation marks for clarity and organisation of written text (L3)

Subject Experts:

1. G Anuradha Laxmi
2. N.S. Berry
3. Chandreie Mukherjee.

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NARSAPUR

UNIT-II 12 Lectures

Prose: Katherine Mansfield: The Doll's House
Poetry: Rabindranath Tagore: Where the Mind Is Without Fear
Grammar & Vocabulary : Phrasal Verbs
Listening: Listening for Main Idea and Supporting Ideas
Speaking: Getting Someone's Attention and Interrupting
Writing: Formal Letters
Learning Outcomes:
At the end of the unit, the student will be able to

1. **Understand** the world through adult & child's points of view (L2)
2. **Perceive** a sense of self dignity & rationality(L5)
3. **Utilize** appropriate phrasal verbs for effective communication(L3)
4. Listen **& Identify** main and supporting ideas in the audio(L3)
5. **Practice** conversational etiquette(L3)
6. **Compose** formal letters(L6)

UNIT-III 12 Lectures

Prose: O. Henry: The Last Leaf
Poetry: Rudyard Kipling: If
Grammar & Vocabulary: Idiomatic Expressions
Listening: Listening for Global Comprehension
Speaking: Asking for Information and Giving Information
Writing: Note-Making
Learning Outcomes:
At the end of the unit, the student will be able to:

1. **Develop** strategies to face challenges in life effectively(L6)
2. **Make use of** idiomatic expressions in oral & written communication(L3)
3. Listen & **Analyse** the audio for Global Comprehension(L4)
4. **Ask** & give information(L2)
5. **Practice** note making study skills(L3)

Subject Experts:

1. G. Lunarea Lakshmi
2. M.S. Berry
3. Chandrasree Mukherjee

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UNIT-III 12 Lectures

Prose: O. Henry: The Last Leaf
Poetry: Rudyard Kipling: If
Grammar & Vocabulary: Idiomatic Expressions
Listening: Listening for Global Comprehension
Speaking: Asking for Information and Giving Information
Writing: Note-Making
Learning Outcomes:
At the end of the unit, the student will be able to:

6. **Develop** strategies to face challenges in life effectively(L6)
7. **Make use of** idiomatic expressions in oral & written communication(L3)
8. Listen & **Analyse** the audio for Global Comprehension(L4)
9. **Ask** & give information(L2)
10. **Practice** note making study skills(L3)

UNIT-IV 12 Lectures

Prose: Francis Bacon: Of Studies
Poetry: Toru Dutt: Our Casuarina Tree
Grammar & Vocabulary : Remedial Grammar I
Listening: Listening to Make Inferences
Speaking: Expressing Opinions, and Agreeing and Disagreeing with Opinions
Writing: Essay Writing
Learning Outcomes:
At the end of the unit, the student will be able to

1. **Develop** the habits of continuous learning(L6)
2. **Use** of Indian philosophy as a way of life(L3)
3. **Identify** and correct common errors in English grammar and usage(L3)
4. **Make inferences** from the audio(L4)
5. **Express** opinions(L6)
6. **Compose** different types of essays(DEAN)(L6)

Subject Experts:

1. G. Lunasena Rao
2. M.S. Berry
3. Chandrasis Mukherjee.

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UNIT-V 12 Lectures

Prose: Mark Twain: Whitewashing the Fence
Poetry: William Ernest Henley: Invictus
Grammar & Vocabulary : Remedial Grammar II
Listening: Listening for Key Ideas
Speaking: Telephone Etiquette
Writing: E-mail Etiquette

Learning Outcomes:
At the end of the unit, the student will be able to

1. **Discover** the humour& moral lessons in the text(L3)
2. **Adapt** to adverse situations.(L6)
3. **Find errors** in grammar ,vocabulary and usage(L5)
4. **Prioritize** key ideas(L5)
5. **Practise** telephone Etiquette(L3)
6. **Compose** E-Mails(L6)

Text Books:

1. **English for Engineers: Theory to practice**. Board of Editors, Orient Black Swan Publishers, India.2024.

Reference Books:

1. English Grammar in Use by Raymond Murphy
2. Oxford English Grammar Course by Michael Swan
3. Word Power Made Easy by Norman Lewis
4. Cambridge Vocabulary for IELTS by Pauline Cullen
5. The Elements of Style by William Strunk Jr. and E.B. White
6. English Vocabulary in Use by Michael McCarthy and Felicity O'Dell
7. Practical English Usage by Michael Swan
8. The Only Grammar Book You'll Ever Need by Susan Thurman
9. Advanced English Grammar: A Linguistic Approach by Ilse Depraetere and Chad Langford

Subject Experts:

1. G. Lavanya Laxmi
2. M.S. Berry
3. Chandrani Mukherjee

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COMMUNICATION SKILLS LAB

I Year B. Tech. II Semester

(Common to the branches: ECE,EEE&CSM)

ANNEXURE-IV

Course Code: **L-T-P-C: 0-0-3-1.5**

Course Outcomes: At the end of the Course, the student shall be able to

C01: **Identify** and pronounce the sounds of English; **choose** the accurate stress in connected speech for proper intonation (L2,L3) [Exp 1,2]

C02: **Identify** the main theme and ideas to **Summarize** audio texts(L2,L5) [Exp 3,4]

C03: **Take part in** Just A Minute (JAM) – Picture Prompts- Narratives-Role Play (L4) [Exp 5,6,7,8]

C04: **Practice** discussions and debates(L3) [Exp 9,10]

C05: **Demonstrate** Presentation Skills(L3) [Exp 11,12]

UNIT-I

Introduction to Phonetics: The Sounds of English (Speech sound – vowels and consonants) - Stress and Intonation - Accent and Rhythm.

Learning Outcomes:

At the end of the unit, the student will be able to

1. **Apply** the phonetic symbols for better pronunciation. (L3)
2. **Choose** appropriate stress, intonation and rhythm of English language for clear communication. (L3)
3. **Improve** student's articulation. (L6)

UNIT-II

Listening Skills: Listening for gist and specific information - listening for Note taking, Summarizing and for opinions - Listening to the speeches of eminent personalities.

Learning Outcomes:

At the end of the unit, the student will be able to

1. **Develop** effective listening skills for better comprehension of academic lectures and English spoken by native speakers (L6).
2. **Apply** effective strategies for good writing (L3)
3. **Demonstrate** writing skills in note taking and summarizing(L3)

Subject Experts:

1. G. Suresh Kumar
2. N.S. Reddy
3. Chandra Mouli

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UNIT-III

Speaking Skills:Just A Minute (JAM) session –Picture Prompts- Narrating stories and anecdotes-Role Play

Learning Outcomes:

At the end of the unit, the student will be able to

1. **Make** use of dialogues for different roles. (L3)
2. **Develop** communication skills in formal and informal situations. (L3)
3. **Improve** speaking skills through participation in activities such as narrating stories and role plays(L6)

UNIT-IV

Speaking skills: Group Discussions-Arguments-Debates

Learning Outcomes:

At the end of the unit, the student will be able to

1. **Focus** on discussions in various formats(L4)
2. **Develop** ideas and arguments to debate.(L3)

UNIT-V

Presentation skills: Verbal and non-verbal communication - Body Language - Making a Presentation

Learning Outcomes:

At the end of the unit, the student will be able to

1. **Design** presentations with PowerPoint slides(L3)
2. **Adapt** postures, gestures, facial expressions and eye contact in formal presentations. (L6)

Reference Books:

1. Language and Life: A Skills Approach Board of Editors, Orient Black swan Publishers, India.2018.
2. A Textbook of English Phonetics for Indian Students, T.Balasubramanian, Macmillan India Ltd.
3. Ashraf Rizvi. Effective Technical Communication. Tata McGraw Hill Education Private Limited, New Delhi.
4. Speak Well. Orient Black swan Publishers, Hyderabad.
5. Allan Pease. Body Language. Manjul Publishing House, New Delhi.

Subject Experts:

1. G. Swarna Latha
2. L.S. Reddy
3. Chandra Mohan

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Web References:

1. https://www.englishlanguageclub.co.uk
2. https://www.ted.ed.com/
3. https://learningenglish.voanews.com/
4. https://www.bbc.co.uk/learningenglish/
5. https://www.abc.net.au/education/learn-english
6. NDTV News

Subject Experts:

1.
2. H.S. Berry
3.

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ADHURAWADA

Annexure-11

Annexure-IX

Introduction to Data science

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction to Data Science Applications-Overview of data science and its significance in different domains, Examples of successful data science applications, Ethical considerations in data science, Data Cleaning and Preprocessing, Data quality assessment and improvement techniques, Handling missing data and outliers, Data transformation and feature engineering, Exploratory Data Analysis, Statistical analysis and data visualization, Identifying patterns, correlations, and trends in data, Feature selection techniques.

UNIT II: Applications of Data Science- Data Science Applications in Healthcare, Data Science Applications in Education, Data Science Applications in Manufacturing and Production, Data Science Applications in Sports, Data Science Applications in Cyber-Security, Data Science Applications in Airlines

UNIT III: Widely Used Techniques in Data Science Applications: Supervised Learning, Unsupervised Learning Reinforcement Learning, A/B Testing, Association Rules, Decision Tree, Cluster Analysis, Advantages and Disadvantages of Clustering, Pattern Recognition

UNIT IV: Data Preprocessing: Feature, Feature Selection, Feature Selection Methods, Objective of Feature Selection, Feature Selection Criteria, Feature Generation Schemes, Applications of Feature Selection, Feature Selection: Issues, Different Types of Feature Selection Algorithms. Classification: Classification, Decision Tree, Regression Analysis, Support Vector Machines, Naive Bayes, Artificial Neural Networks

UNIT V: Clustering: Cluster Analysis, Types of Clusters, K-Means, Reducing the SSE with Post-processing ,Bisecting K-Means, Agglomerative Hierarchical Clustering, DBSCAN Clustering Algorithm, Cluster Evaluation, General Characteristics of Clustering Algorithms Usman Qamar, Muhammad Summair Raza

UNIT VI: Text Mining: Text Mining Applications, Exploratory Text Analysis, Information Extraction , Automatic Text Classification, Text Categorization Types, Text Categorization Approaches, Perspectives for Text Categorization ,Text Categorization Applications, Representation of Document, Text Document Preprocessing , Opinion Mining, Sentiment Classification.

UNIT VII: Data Visualization: Principles of effective data visualization, Visualizing relationships, distributions, and trends, Interactive and dynamic visualizations, Applications of Data Science in Business Analytics. Role of Data Science in Revolutionizing Healthcare , BERT- and Fast Text-Based Research Paper Recommender System

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Text Books:

1. "Data Science for Applications: Concepts, Techniques, and Practical Examples", John Smith, Publisher: DataTech Publishing, ISBN: 978-1234567890.

Reference Books:

1. Data Science Techniques and Intelligent Applications, Chapman & Hall/CRC, 2022, Pallavi Vijay Chavan, Parikshit N. Mahalle, Ramchandra Mangrulkar, Idongesit Williams

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Cloud Computing and Virtualization

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction to Cloud: The vision of cloud computing, Defining a cloud, The cloud computing reference model, Characteristics and benefits, Challenges, Principles of Parallel and Distributed Computing, Virtualization: Characteristics and Taxonomy of Virtualization Techniques, Virtualization and cloud computing, Cloud Computing Architecture.

UNIT II: Virtual Machines and Virtualization of Clusters and Data Centres: Implementation Levels of Virtualization, Virtualization Structures/Tools and Mechanisms, Virtualization of CPU, Memory, and I/O Devices, Virtual Clusters and Resource Management, Virtualization for Data-Centre Automation.

UNIT III: Service-Oriented Architectures for Distributed Computing: Services and Service-Oriented Architecture, Message-Oriented Middleware, Workflow in Service-Oriented Architectures.

UNIT IV: Cloud Programming and Software Environments: Parallel and Distributed Programming Paradigms, Programming Support of Google App Engine, Programming on Amazon AWS and Microsoft Azure, Emerging Cloud Software Environments

UNIT V: Grid Computing Systems and Resource Management: Grid Architecture and Service Modelling, Grid Projects and Grid Systems Built, Grid Resource Management and Brokering, Software and Middleware for Grid Computing, Grid Application Trends and Security Measures

UNIT VI: Peer-to-Peer Computing and Overlay Networks: Peer-to-Peer Computing Systems, P2P Overlay Networks and Properties, Routing, Proximity, and Fault Tolerance, Trust, Reputation, and Security Management, P2P File Sharing and Copyright Protection.

UNIT VII: Ubiquitous Clouds and the Internet of Things: Cloud Trends in Supporting Ubiquitous Computing, Performance of Distributed Systems and the Cloud, Enabling Technologies for the Internet of Things, Innovative Applications of the Internet of Things, Online Social and Professional Networking.

Text Books:

1. Kai Hwang, Geoffrey C. Fox and Jack J. Dongarra, "Distributed and cloud computing from Parallel Processing to the Internet of Things", Morgan Kaufmann, Elsevier, 2012.

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Reference Books:

1. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, "Mastering Cloud Computing", Tata Mcgraw Hill, 2013.
2. Cloud Computing:Theory and Practice, Dan C. Marinescu, Morgan Kaufmann, Elsevier, 2012
3. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing – A Practical Approach, Tata Mcgraw Hill, 2009
4. Barrie Sosinsky, "Cloud Computing Bible" John Wiley & Sons, 2010.

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Elective-I Big Data Analytics

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction to big data: What is big data, why big data, convergence of key trends, unstructured data, industry examples of big data, web analytics, big data and marketing, fraud and big data, risk and big data, credit risk management, big data and algorithmic trading, big data and healthcare, big data in medicine, advertising and big data, big data technologies, introduction to Hadoop, open source technologies, cloud and big data,

UNIT II: Introduction to NoSQL, aggregate data models, aggregates, key-value and document data models, relationships, graph databases, schema less databases, materialized views, distribution models, sharding, master-slave replication, peer- peer replication, sharding and replication, consistency, relaxing consistency, version stamps, Working with Cassandra ,Table creation, loading and reading data

UNIT III: Hadoop and Mapreduce: Data formats, analyzing data with Hadoop, scaling out, Architecture of Hadoop distributed file system (HDFS), fault tolerance ,with data replication, High availability, Data locality , Map Reduce Architecture, Process flow, Java interface, data flow, Hadoop I/O, data integrity, compression, serialization

UNIT IV: Introduction to Hive, data types and file formats, HiveQL data definition, HiveQL data manipulation, Logical joins, Window functions, Optimization, Table partitioning, Bucketing, Indexing, Join strategies

UNIT V: Apache spark- Advantages over Hadoop, lazy evaluation, In memory processing, DAG, Spark context, Spark Session, RDD, Transformations- Narrow and Wide, Actions, Data frames ,RDD to Data frames, Catalyst optimizer, Data Frame Transformations, Working with Dates and Timestamps, Working with Nulls in Data, Working with Complex Types, Working with JSON, Grouping,

UNIT VI: Apache spark :Window Functions, Joins, Data Sources, Broadcast Variables, Accumulators, Deploying Spark- On-Premises Cluster Deployments, Cluster Managers-Standalone Mode, Spark on YARN , Spark Logs, The Spark UI- Spark UI History Server, Debugging and Spark First Aid

UNIT VII: Apache spark tuning: Spark-Performance Tuning, Stream Processing Fundamentals, Event-Time and State full Processing - Event Time, State full Processing, Windows on Event Time- Tumbling Windows, Handling Late Data with Watermarks, Dropping Duplicates in a Stream, Structured Streaming Basics - Core Concepts, Structured Streaming in

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Action, Transformations on Streams, Input and Output

Text Books:

1. Big Data, Big Analytics: Emerging, Michael Minnelli, Michelle Chambers, and Ambiga Dhiraj.

Reference Books:

1. SPARK: The Definitive Guide, Bill Chambers & Matei Zaharia, O'Reilley, 2018 Edition
2. Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013
3. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World Polyglot Persistence", Addison-Wesley Professional, 2012
4. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley, 2012
5. "Hadoop Operations", O'Reilley, Eric Sammer, 2012
6. "Programming Hive", O'Reilley, E. Capriolo, D. Wampler, and J. Rutherglen, 2012
7. "HBase: The Definitive Guide", O'Reilley, Lars George, 2011
8. "Cassandra: The Definitive Guide", O'Reilley, Eben Hewitt, 2010
9. "Programming Pig", O'Reilley, Alan Gates, 201

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Elective-I Computational Linear Algebra

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Basic Linear Algebra Subprograms: BLAS: An Introductory Example, Matrix Notations, IEEE Floating Point Systems and Computer Arithmetic, Vector-Vector Operations: Level-1 BLAS, Matrix-Vector Operations: Level-2, BLAS Matrix-Matrix Operations: Level-3 BLAS, Sparse Matrices: Storage and Associated Operations..

UNIT II: Basic Concepts for Matrix Computations: Vector Norms, Complements on Square Matrices, Rectangular Matrices: Ranks and Singular Values, Matrix Norms.

UNIT III: Gauss Elimination and LU Decompositions of Matrices : Special Matrices for LU Decomposition, Gauss Transforms, Naive LU Decomposition for a Square Matrix with Principal Minor Property (pmp), Gauss Reduction with Partial Pivoting: PLU Decompositions, MATLAB Commands Related to the LU Decomposition, Condition Number of a Square Matrix.

UNIT IV: Orthogonal Factorizations and Linear Least Squares Problems : Formulation of Least Squares Problems: Regression Analysis, Existence of Solutions Using Quadratic Forms, Existence of Solutions through Matrix Pseudo-Inverse, The QR Factorization Theorem, Gram-Schmidt Orthogonalization: Classical, Modified, and Block Solving, the Least Squares Problem with the QR Decomposition, Householder QR with Column Pivoting, MATLAB Implementations

UNIT V: Algorithms for the Eigenvalue Problem : Basic Principles, QR Method for a Non-Symmetric Matrix, Algorithms for Symmetric Matrices, Methods for Large Size Matrices, Singular Value Decomposition.

UNIT VI: Iterative Methods for Systems of Linear Equations : Stationary Methods, Krylov Methods, Method of Steepest Descent for spd Matrices, Conjugate Gradient Method (CG) for spd Matrices, The Generalized Minimal Residual Method, The Bi-Conjugate Gradient Method, Preconditioning Issues.

UNIT VII: Sparse Systems to Solve Poisson Differential Equations : Poisson Differential Equations, The Path to Poisson Solvers, Finite Differences for Poisson-Dirichlet Problems, Variational Formulations, One-Dimensional Finite-Element Discretizations.

Text Books:

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1. INTRODUCTION TO COMPUTATIONAL LINEAR ALGEBRA by Nabil Nassif, Jocelyne Erhel, Bernard Philippe. CRC Press, Taylor & Francis Group, 6000 Broken Sound Parkway NW, Suite 300 Boca Raton, FL 33487-2742, 2016.

Reference Books:

1. Gilbert Strang, Linear Algebra and its Applications, Fourth Edition, Cambridge University Press. 2009.
2. Gene H. Golub and V. Van Loan, Matrix Computations, Third Edition, John Hopkins University Press, Baltimore, 1996.
3. David C. Lay, Linear Algebra and Its Applications, Pearson Addison Wesley, 2002.
4. Strang, Gilbert. Linear algebra and learning from data. Cambridge: Wellesley-Cambridge Press, 2019.

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Elective-I

Soft Computing

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction: What is Soft Computing? ,Fuzzy Systems,Rough Sets, Artificial Neural Networks, Evolutionary Search Strategies,
FUZZY SETS: Crisp Sets, Fuzzy Sets, Fuzzy Membership Functions, Operations on Fuzzy Sets, Fuzzy Relations, Fuzzy Extension Principle.

UNIT II: Fuzzy Logic: Crisp Logic, Fuzzy Logic Basics, Fuzzy Truth in Terms of Fuzzy Sets, Fuzzy Rules, Fuzzy Reasoning,

UNIT III: Fuzzy Inference Systems: Introduction, Fuzzification of the Input Variables, Application of Fuzzy Operators on the Antecedent Parts of the Rules, Evaluation of the Fuzzy Rules, Aggregation of Output Fuzzy Sets Across the Rules, Defuzzification of the Resultant Aggregate Fuzzy Set, Fuzzy Controllers.

UNIT IV: Rough Sets: Information Systems and Decision Systems, Indiscernibility, Set Approximations, Properties of Rough Sets.

UNIT V: Neural Networks: Machine Learning Using Neural Network, Adaptive Networks, Feed forward Networks, Supervised Learning Neural Networks, Radial Basis Function Networks: Reinforcement Learning, Unsupervised Learning Neural Networks, Adaptive Resonance architectures

UNIT VI: Basics of Genetic Algorithms: Introduction to Genetic Algorithms (GA), Applications of GA in Machine Learning: Machine Learning Approach to Knowledge Acquisition.

UNIT VII: Deep Networks : Introduction to Deep learning – Deep neural networks – concepts. Recurrent neural network - concepts – applications.

Text Books:

1. Samir Roy, Udit Chakraborty, Introduction to Soft Computing: Neuro-Fuzzy and Genetic Algorithms, Pearson, 2013

Reference Books:

1. Jyh-Shing Roger Jang, Chuen:Tsai Sun, EijiMizutani, Neuro:Fuzzy and Soft Computing®,Prentice Hall of India, 2003

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2. Saroj Kaushik, Sunita Tiwari, Soft computing: Fundamentals, Techniques and applications,Mc Graw Hill Education, 2018
3. Sivanandam&Deepa, "Principles of Soft Computing", 2nd Edition, Wiley India, 2011
4. Snehashish Chakraverty, Deepti Moyi Sahoo, Nisha Rani Mahato,Concepts of Soft Computing: Fuzzy and ANN with Programming, Springer,2019.
5. Samir Roy, Udit Chakraborty, Introduction to Soft Computing: Neuro-Fuzzy and Genetic Algorithms, Pearson, 2013.
6. D. E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", 1st Edn, Pearson, 2016

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Elective-I Computational Biology

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: DNA computing: Motivation- DNA structure- processing and computational operations- steps involved in DNA computation- Filtering models: Adleman's experiment-Lipton's solution-Scope and Applications of DNA computing- Search Algorithms: Hill climbing, Simulated annealing:-introduction-Simulated annealing algorithm.

UNIT II: Combinatorial Pattern Matching: Hash Tables, Repeat Finding, Exact Pattern Matching; Genetic Algorithm: Basic Concepts, Reproduction, Cross over, Mutation, Fitness Value, Optimization using GAs; Applications of GA in bioinformatics.

UNIT III: Hidden Markov Model: Markov processes and Markov Models, Hidden Markov Models. Forward and Backward Algorithms, Most probable state path: Viterbi algorithm, Parameter Estimation for HMMs:-Baum-Welch Algorithm, Applications of profile HMMs for multiple alignment of proteins and for finding genes in the DNA

UNIT IV: Designing Effective Visualizations: -Steps in Designing Visualizations,- Problems in Designing Effective Visualizations.- Comparing and Evaluating Visualization Techniques-User Tasks- User Characteristics Data Characteristics -Visualization Characteristics-,Structures for Evaluating Visualizations Benchmarking Procedures-,An Example of Visualization Benchmarking

UNIT V: Support Vector Machines: Introduction- hyperplane separation (maximum and soft margin hyperplanes)-linear classifier-Kernel functions, Large Margin Classification, Optimization problem with SVM- Applications of SVM in bioinformatics

UNIT VI: Bayesian network: Bayes Theorem-Inference and learning of Bayesian network- BN and Other Probabilistic Models

UNIT VII: Artificial Neural Network: Historic evolution – Perceptron, characteristics of neural networks terminology, models of neuron Mc Culloch – Pitts model, Perceptron, Adaline model, Basic learning laws, Topology of neural network architecture, single layer ANN, multilayer perceptron, back propagation learning, input - hidden and output layer computation, back propagation algorithm, Applications of ANN.

Text Books:

1. An introduction to bioinformatics algorithms by Neil C. Jones, Pavel Pevzner. MIT Press.2004.

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Reference Books:

1. Biological sequence analysis: Probabilistic models of proteins and nucleic acids by Richard Durbin, Eddy, Anders Krogh, 1998
2. Algorithms for Molecular Biology by Ron Shamir Lecture, Fall Semester, 2001
3. Neural Networks: A Systematic Introduction by Raul Rojas. Springer. 1996
4. Artificial Intelligence and Games by Georgios N. Yannakakis and Julian Togelius, Springer 2018
5. Bioinformatics: the machine learning approach by Pierre Baldi, Søren Brunak. MIT Press.2001.
6. Bioinformatics: Sequence and Genome Analysis: by David Mount, University of Arizona,Tucson. 2005
7. Fundamentals of natural computing : Basic concepts, Algorithms and Applications, Chapman & Hall / CRC, Taylor & Francis group, 2006

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Elective-I Internet of Things

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Fundamentals of IoT: Evolution of Internet of Things, Enabling Technologies, IoT Architectures: oneM2M, IoT World Forum (IoTWF) and Alternative IoT models, Simplified IoT Architecture and Core IoT Functional Stack, Fog, Edge and Cloud in IoT, Functional blocks of an IoT ecosystem, Sensors, Actuators, Smart Objects and Connecting Smart Objects

UNIT II: IoT Protocols: IoT Access Technologies: Physical and MAC layers, topology and Security of IEEE 802.15.4, 802.15.4g, 802.15.4e, 1901.2a, 802.11ah and LoRaWAN, Zigbee protocol, Network Layer: IP versions, Constrained Nodes and Constrained Networks

UNIT III: Optimizing IP for IoT: From 6LoWPAN to 6Lo, Routing over Low Power and Lossy Networks, Application Transport Methods: Supervisory Control and Data Acquisition, Application Layer Protocols: CoAP and MQTT

UNIT IV: Design and Development: Design Methodology, Embedded computing logic, Microcontroller, System on Chips, IoT system building blocks, Arduino–Board details, IDE programming, Raspberry Pi and Interfaces

UNIT V: Data Analytics and Supporting Services: Structured Vs Unstructured Data and Data in Motion Vs Data in Rest, Role of Machine Learning-No SQL Databases, Hadoop Ecosystem, Apache Kafka, Apache Spark, Edge Streaming Analytics and Network Analytics, Xively Cloud for IoT

UNIT VI: Python Web Application Framework, Django, AWS for IoT, System Management with NETCONF-YANG, Kibana, Fault-tolerant data processing on devices.

UNIT VII: Case Studies/Industrial Applications: Cisco IoT system, IBM Watson IoT platform, Manufacturing, Converged Plantwide Ethernet Model (CPwE), Power Utility Industry, GridBlocks Reference Model, Smart and Connected Cities: Layered architecture, Smart Lighting, Smart Parking Architecture and Smart Traffic Control

Course outcome: At the end of the course.

Text Books:

1. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, IoT Fundamentals:Networking Technologies, Protocols and Use Cases for Internet of Things, Cisco Press, 2017

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Reference Books:

1. Arshdeep Bahga, Vijay Madisetti, Internet of Things – A hands-on approach, Universities Press, 2015.
2. Olivier Hersent, David Boswarthick, Omar Elloumi , The Internet of Things – Key applications and Protocols, Wiley, 2012
3. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stamatis, Karnouskos, Stefan Avesand, DavidBoyle, From Machine-to-Machine to the Internet of Things –Introduction to a New Age of Intelligence, Elsevier, 2014.
4. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), Architecting the Internet of Things, Springer, 2011.
5. Michael Margolis, Arduino Cookbook, Recipes to Begin, Expand, and Enhance Your Projects, 2nd Edition, O'Reilly Media, 2011

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Elective-II Cyber Security for Data Science

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction to Cyber Security-Cyber security objectives, roles, differences between information security and cyber security, Cyber security principles-confidentiality, integrity, availability, authentication and non-repudiation.

UNIT II: Information Security within Lifecycle Management-Lifecycle management landscape, Security architecture processes, Security architecture tools, Intermediate lifecycle management concepts.

UNIT III: Risks & Vulnerabilities-Basics of risk management, Operational threat environments, Classes of attacks.

UNIT IV: Incident Response-Incident categories, Incident response, Incident recovery, **Operational security protection**-Digital and data assets, ports and protocols, Protection technologies, Identity and access Management, configuration management.

UNIT V: Threat Detection and Evaluation Monitoring-Vulnerability management, Security logs and alerts, Monitoring tools and appliances

UNIT VI: Analysis-Network traffic analysis, packet capture and analysis.

UNIT VII: Data Visualization: Introduction to backdoor System and security-Introduction to metasploit, backdoor, demilitarized zone (DMZ), Digital signature, Brief study on Harding of operating system.

Text Books:

1. NASSCOM: Security Analyst Student Hand Book, Dec 2015

Reference Books:

1. Information Security Management Principles, Updated Edition, David Alexander, Amanda Finch, David Sutton, BCS publishers, June 2013.
2. Cyber Security Fundamentals-Cyber Security, Network Security and Data Governance Security, 2nd Edition, ISACA Publishers

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Elective-II OPTIMIZATION TECHNIQUES FOR DATA SCIENCE

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction- mathematical optimization, least-squares and linear programming, convex and nonlinear optimization. convex sets.

UNIT II: Convex optimization problems - optimization problem in standard form, convex optimization problems, quasi-convex optimization, linear optimization

UNIT III: Quadratic optimization: generalized inequality constraints, semi definite programming, vector optimization. Duality, approximation and fitting, statistical estimation, geometric problems

UNIT IV: Unconstrained minimization- gradient descent method, steepest descent method, Newton's method.

UNIT V: Equality constrained minimization - equality constrained minimization, eliminating equality constraints, Newton's method with equality constraints, infeasible start Newton method, and implementation.

UNIT VI: Interior-point methods -inequality constrained minimization, logarithmic barrier function and central path, barrier method, L1 Norm optimization methods.

UNIT VII: Introduction to Neural Networks - Alternating direction method of multipliers (ADMM) and applications (16 applications mentioned by Prof. Stephen Boyd)

Text Books:

1. Kalyanmoy, Deb. Optimization for engineering design: Algorithms and examples. Prentice-Hall of India Pvt. Limited, 2012.

Reference Books:

1. Chong, Edwin KP, and Stanislaw H. Zak. An introduction to optimization. John Wiley & Sons, 2004.
2. Bhatti, M. Asghar. Practical Optimization Methods: With Mathematica® Applications. Springer Science & Business Media, 2012
3. Stephen P. Boyd, and Lieven Vandenberghe. Convex optimization. Cambridge university press, 2004

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Elective-II Time Series Data Analysis

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction to time series analysis, stationary and non stationary datasets. Finding the trend and seasonal components of signal. Auto Correlation Function (ACF) and Partial Auto Correlation Function (PACF).

UNIT II: Stationary Process and ARMA Models: Forecasting stationary time series using ARMA.

UNIT III: Nonstationary and Seasonal Time Series Models: Seasonal ARIMA models.

UNIT IV: Multivariate Time Series: Multivariate ARMA processes, Modeling and forecasting

UNIT V: Forecasting Techniques: The Holt-Winter algorithm & Holt-Winter seasonal algorithm.

UNIT VI: Time series forecasting using ML algorithms: Linear Regression ,Multi Linear Regression and ensemble techniques.

UNIT VII: Introduction to Recurrent Neural Networks (RNN), Long Short Term Memory (LSTM) and its role in time series forecasting.

Text Books:

1. Brockwell, Peter J. and Davis, Richard A. (2002). Introduction to Time Series and Forecasting, 2nd edition. Springer-Verlag, New York.

Reference Books:

1. Shumway, R.H and Stoffer, D.S., Time Series Analysis and its Applications: With r Examples, Springer.
2. Box, G.E.P., Jenkins, G.M. and Reinsel, G.C. (1994). Time Series Analysis: Forecasting and Control, 3rd Edition, Prentice Hall, New Jersey.
3. Chatfield, C. (1996). The Analysis of Time Series, 5th edition, Chapman and Hall, New York.
4. James D. Hamilton (1994). Time Series Analysis, 1st Edition, Princeton University Press

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Elective-II Natural Language Processing

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: INTRODUCTION: Origins and challenges of NLP - Language Modelling: Grammar-based LM, Statistical LM - Regular Expressions, Finite-State Automata - English Morphology, Transducers for lexicon and rules,
Tokenization, Detecting and Correcting Spelling Errors, Minimum Edit Distance.

UNIT II: WORD LEVEL ANALYSIS: Unsmoothed N-grams, Evaluating N-grams, Smoothing, Interpolation and Backoff - Word Classes.

UNIT III: MODELS FOR SEQUENTIAL TAGGING: Smoothing, Interpolation and Backoff - Word Classes, Part of-
Speech Tagging, Rule-based, Named Entities and Named Entities Tagging, Evaluation of Named Entity Recognition,Vector Semantics Embedding, Lexical Semantics.

UNIT IV: SYNTACTIC ANALYSIS: Context-Free Grammars, Grammar rules for English, Treebanks, Normal Forms for grammar -Dependency Grammar - Syntactic Parsing, Ambiguity

UNIT V: DYNAMIC PROGRAMMING PARSING- Shallow parsing– Probabilistic CFG, Probabilistic CYK, Probabilistic Lexicalized CFGs – Feature structures, Unification of feature structures.

UNIT VI: SEMANTICS AND PRAGMATICS: Requirements for representation, First-Order Logic, Description Logics – Syntax-Driven Semantic analysis, Semantic attachments – Word Senses, Relations between Senses, Thematic Roles, selectional restrictions – Word Sense Disambiguation, WSD using Supervised, Dictionary & Thesaurus,
Bootstrapping methods – Word Similarity using Thesaurus and Distributional methods.

UNIT VII: DISCOURSE ANALYSIS AND LEXICAL RESOURCES: Discourse segmentation, Coherence – Reference Phenomena, Anaphora Resolution using Hobbs and Centering Algorithm – Coreference Resolution – Resources: Porter Stemmer, Lemmatizer, WordNet, PropBank, FrameNet, Brown Corpus, British National Corpus(BNC).

Text Books:

1. Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech, 2nd Edition, Daniel Jurafsky, James H. Martin—Pearson Publication, 2014.

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Reference Books:

1. Natural Language Processing with Python, First Edition, Steven Bird, Ewan Klein and Edward Loper, OReilly Media, 2009.
2. Language Processing with Java and LingPipe Cookbook, 1st Edition, Breck Baldwin, Atlantic Publisher, 2015.
3. Handbook of Natural Language Processing, Second, Nitin Indurkhya and Fred J. Damerau, Chapman and Hall/CRC Press, 2010. Edition.
4. Natural Language Processing and Information Retrieval, 3rd Edition, Tanveer Siddiqui, U.S. Tiwary, Oxford University Press, 2008.

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Elective-II Statistical Modeling

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction to Random process, types and their probability distributions, Expectation, mean and variance,

UNIT II: Sampling: Estimating the Population Mean (μ), Population Proportion, Sample Size and its Determination. Sample Size through the Approach Based on Precision Rate and Confidence Level.

UNIT III: Hypothesis testing- Z, t, Chi-Square & F-test. ANOVA & Designs of Experiments - Single, Two factor ANOVA, Factorials ANOVA models.

UNIT IV: Model selection, AIC, BIC, SIC, bias-variance trade-off; ARMA models.

UNIT V: Univariate Regression and its estimation techniques and analysis

UNIT VI: Multivariate Regression and its estimation techniques and analysis

UNIT VII: State-space models, Kalman filter, hidden state, HMM, Switching models, hidden Markov models.

Text Books:

1. Jay L. Devore, Probability and Statistics for Engineering and the Sciences, 8th edition, Cengage, 2012.

Reference Books:

1. T. VeeraRajan, Probability, Statistics and Random processes, Tata McGraw-Hill,2008
2. Research Methodology: Methods and Techniques: C.R. Kothari, New Age International Publishers
3. Sheldon M. Ross, Introduction to probability and statistics for engineers and scientists, 4th edition, Elsevier, 2009.
4. Levin R.I. and Rubin D.S., Statistics for Management, 7th edition, Prentice Hall of India Pvt. Ltd., New Delhi, 2001

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Data Science Applications with Python Lab

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week **Time: 3 Hours** **Credits: 2**
Internal: 50 Marks **External: 50 Marks** **Total: 100 Marks**

Experiment 1:
Write a Python Program to Find the Sum of the Series: 1 + 1/2 + 1/3 + .. + 1/N

Experiment 2:
Write a Python Program to Split the array and add the first part to the

Experiment 3:
Write a Python Program to Create a List of Tuples with the First Element as the Number and Second Element as the Square of the Number

Experiment 4:
Write a Python program to count number of vowels using sets in given string

Experiment 5:
Write a program to implement permutation of a given string using inbuilt function.

Experiment 6:
Write a python program to sort list of dictionaries by values in Python – Using lambda function.

Experiment 7:
Write a Python Program for following sorting:
i. Quick Sort ii. Heap Sort

Experiment 8:
Write a Python Program to Reverse a String Using Recursion

Experiment 9:
Write a Python Program to Count the Number of Words in a Text File

Experiment 10:
Write a Python Program to Read the Contents of a File in Reverse Order

Experiment 11:
Write a program to Merge and Join DataFrames with Pandas in Python

Experiment 12:

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Annexure-XXI

Write a program to implement Merge and Join DataFrames with Python Pandas

Experiment 13:
Write a Python Program to Append the Contents of One File to Another File

Experiment 14:
How to install and Load CSV files to Python Pandas

Experiment 15:
Write a program to implement Data analysis and Visualization with Python using pandas.

Experiment 16:
Write a program to Implement Plotting Functions in python pandas

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Cloud Computing and Big Data Analytics Lab

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 2**
Internal: 50 Marks	**External: 50 Marks**	**Total: 100 Marks**

Cloud Computing Programs:

Experiment-1

Create Virtual Machine on Azure

a. A Windows VM
b. Linux VM

Experiment-2

Create a Web app and host it in Azure, use web app to accept files and upload them to blob storage

a. Create Storage accounts in Azure and upload files
b. Create SQL Database to store info
c. Use Azure KeyVault to store secrets such as connection strings
d. Use managed Identity to access secrets from KeyVault, access SQL DB & storage accounts
e. Create Service Bus to accept messages
f. Create App Insights to get logging
g. Create Azure Monitor to get notifications

Experiment-3

Create a function apps

a. Create function app with HTTP trigger
b. Create function app with Timer trigger
c. Create function app with Storage trigger
d. Create Service bus trigger to process messages asynchronously

Experiment-4

Create Traffic Manager / Azure Front Door & APIM

a. Identify the best case scenarios for these

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Experiment-5

Create a Tenant in Azure Active directory

a. Create users in the tenant and use Microsoft Authentication Library (MSAL)
b. Use Azure AD as Identity provider for your web apps

Experiment-6

Create a Azure container registry

a. Deploy a container from the registry to an AppService
b. Create an Azure Kubernetes Cluster and deploy

Experiment-7

Create an Azure Open AI service and use them in your application

Big Data Analytics Programs:

Experiment-1

Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.

Experiment-2

Write a Map Reduce program that mines weather data. Weather sensors collecting data every hour at many locations across the globe gather large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented.
Data available at: https://github.com/tomwhite/hadoopbook/tree/master/input/ncdc/all

Experiment 3:

Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.

Experiment 4:

Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and Indexes

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Machine Learning

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction-Towards Intelligent Machines, Well posed Problems, Example of Applications in diverse fields, Data Representation, Domain Knowledge for Productive use of Machine Learning, Diversity of Data: Structured / Unstructured, Forms of Learning, Machine Learning and Data Mining, Basic Linear Algebra in Machine Learning Techniques.

UNIT II: Supervised Learning- Rationale and Basics: Learning from Observations, Bias and Why Learning Works: Computational Learning Theory, Occam's Razor Principle and Overfitting Avoidance Heuristic Search in inductive Learning, Estimating Generalization Errors, Metrics for assessing regression, Metris for assessing classification

UNIT III: Statistical Learning- Machine Learning and Inferential Statistical Analysis, Descriptive Statistics in learning techniques, Bayesian Reasoning: A probabilistic approach to inference, K-Nearest Neighbor Classifier. Discriminant functions and regression functions, Linear Regression with Least Square Error Criterion, Logistic Regression for Classification Tasks, Fisher's Linear Discriminant and Thresholding for Classification, Minimum Description Length Principle

UNIT IV: Support Vector Machines (SVM)- Introduction, Linear Discriminant Functions for Binary Classification, Perceptron Algorithm, Large Margin Classifier for linearly seperable data, Linear Soft Margin Classifier for Overlapping Classes, Kernel Induced Feature Spaces, Nonlinear Classifier, Regression by Support vector Machines

UNIT V: Learning with Neural Networks: Towards Cognitive Machine, Neuron Models, Network Architectures, Perceptrons, Linear neuron and the Widrow-Hoff Learning Rule, The error correction delta rule

UNIT VI: MLP: Multilayer Perceptron Networks and error back propagation algorithm, Radial Basis Functions Networks

UNIT VII: Decision Tree Learning: Introduction, Example of classification decision tree, measures of impurity for evaluating splits in decision trees, ID3, C4.5, and CART decision trees, pruning the tree, strengths and weakness of decision tree approach.

Text Books:

1. Applied Machine Learning, M.Gopal, Mc Graw Hill Education.

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Reference Books:

1. Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2007.
2. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press, 2012
3. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer 2009 (freely available online).

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Data Visualization

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction: What Is Visualization?- History of Visualization- Relationship between Visualization and Other fields – The Visualization Process-Pseudocode Conventions-The Scatterplot and The Role of the User.- Data Foundations Types of Data, Structure within and between Records-Data Pre-processing.

UNIT II: Human Perception and Information Processing: What Is Perception? –Physiology-Perceptual Processing- Perception in Visualization- Metrics Visualization Foundations.- The Visualization Process in Detail-Semiology of Graphical Symbols-The Eight Visual Variables-Historical Perspective-Taxonomies-Metrics Visualization Foundations-TheVisualization Process in Detail-Semiology of Graphical Symbols-The Eight Visual Variables-Historical Perspective-Taxonomies

UNIT III: Interaction Concepts: Interaction Operators-Interaction Operands and Spaces,- A Unified Framework.- Interaction Techniques- Screen Space, Object Space (D Surfaces), Data Space (Multivariate Data Values)-Attribute Space (Properties of Graphical Entities)-Data Structure Space (Components of Data Organization)- Visualization Structure Space (Components of the Data Visualization).-Animating Transformations Interaction Control.

UNIT IV: Designing Effective Visualizations: -Steps in Designing Visualizations,- Problems in Designing Effective Visualizations.- Comparing and Evaluating Visualization Techniques-User Tasks- User Characteristics Data Characteristics -Visualization Characteristics-,Structures for Evaluating Visualizations Benchmarking Procedures-,An Example of Visualization Benchmarking

UNIT V: Visualization Systems: Systems Based on Data Type-Systems Based on Data Analysis Type-Text Analysis and Visualization-Modern Integrated Visualization Systems Toolkits

UNIT VI: Research Directions in Visualization: Issues of Data Issues of Cognition-Perception, and Reasoning-Issues of System Design-Issues of Evaluation-Issues of Hardware-Issues of Applications

UNIT VII: Visualization Techniques for Spatial Data: One-Dimensional Data,-Two-Dimensional Data-Three-Dimensional Data-Dynamic Data Combining Techniques
Visualization Techniques for Time-Oriented Data:Introduction, Definitions-Characterizing Time-Oriented Data-Visualizing Time-Oriented Data-Time Bench: A Data Model and Software Library for Visual Analytics of Time-Oriented Data

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Text Books:

1. Ward, Grinstein Keim, Interactive Data Visualization: Foundations, Techniques, and Applications. Natick: A K Peters, Ltd,2015.

Reference Books:

1. Charu C. Aggarwal, Recommender Systems: The Textbook, 1/e, Springer, 2016.
2. Ricci F., Rokach L., Shapira D., Kantor B.P., Recommender Systems Handbook, Springer, 2015.
3. Manouselis N., Drachsler H., Verbert K., Duval E., Recommender Systems for Learning, Springer, 2013. (no update)
4. Kristen Sosulski, Data Visualization Made Simple: Insights into Becoming Visual, Routledge; 1st edition,2018

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Elective-III Image and Video Analytics

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Digital image representation- Visual Perception- Sampling and Quantization- Basic Relations between Pixels- Mathematical Tools Used in Digital Image Processing: Fundamental Operations –Vector and Matric Operations- Image Transforms (DFT, DCT, DWT, Hadamard)..

UNIT II: Fundamentals of spatial filtering: spatial correlation and convolution-smoothingblurringsharpening- edge detection - Basics of filtering in the frequency domain: smoothing-blurring- sharpening- -Histograms and basic statistical models of image.

UNIT III: Colour models and Transformations – Image and Video segmentation-Image and video demonising- Image and Video enhancement- Image and Video compression

UNIT IV: Object detection and recognition in image and video-Texture models Image and Video classification models- Object tracking in Video.

UNIT V: Applications and Case studies- Industrial- Retail- Transportation & Travel- Remote sensingVideo Analytics in WSN: IoT Video Analytics Architectures.

Text Books:

1. " Digital Image Processing". 3rd Edition, R.C. Gonzalez and R.E. Woods Addison Wesley, 2007.

Reference Books:

1. "Computer Vision: Algorithms and Applications", Richard Szelisk, Springer 2011
2. "Nonparametric and Semi parametric Models", W. Härdle, M. Müller, S. Sperlich, A. Werwatz, Springer, 2004.
3. "Intelligent Video Surveillance Systems", Jean-Yves Dufour, Wiley, 2013.
4. "Video Analytics for Business Intelligence", Caifeng Shan, Fatih Porikli, Tao Xiang, Shaogang Gong, Springer, 2012.
5. "Intelligent Transport Systems: Technologies and Applications", AsierPerallos, Unai HernandezJayo, Enrique Onieva, Ignacio Julio García Zuazola, Wiley,2015.
6. "Analysis of Urban Growth and Sprawl from Remote Sensing Data", Basudeb Bhatta, Springer, 2010

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Elective-III Social Media Analytics

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Social Media Analytics: An Overview Core Characteristics of Social Media, Types of Social Media, Social media landscape, Need for Social Media Analytics (SMA), SMA in small & large organizations. Purpose of Social Media Analytics, Social Media vs. Traditional Business Analytics, Seven Layers of Social Media Analytics, Types of Social Media Analytics, Social Media Analytics Cycle, Challenges to Social Media Analytics, Social Media Analytics Tools.

UNIT II: Social Network Structure, Measures & Visualization Basics of Social Network Structure - Nodes, Edges & Tie Describing the Networks Measures - Degree Distribution, Density, Connectivity, Centralization, Tie Strength & Trust Network Visualization - Graph Layout, Visualizing Network features, Scale Issues. Social Media Network Analytics - Common Network Terms, Common Social Media Network Types, Types of Networks, Common Network Terminologies, Network Analytics Tools

UNIT III: Social Media Text, Action & Hyperlink Analytics

Social Media Text Analytics - Types of Social Media Text, Purpose of Text Analytics, Steps in Text Analytics, Social Media Text Analysis Tools Social Media Action Analytics - What Is Actions Analytics? Common Social Media Actions, Actions Analytics Tools Social Media Hyperlink Analytics - Types of Hyperlinks, Types of Hyperlink Analytics, Hyperlink Analytics Tools

UNIT IV: Social Media Location & Search Engine Analytics Location Analytics - Sources of Location Data, Categories of Location Analytics, Location Analytics and Privacy Concerns, Location Analytics Tools Search Engine Analytics - Types of Search Engines, Search Engine Analytics, Search Engine Analytics Tools

UNIT V: Social Information Filtering Social Information Filtering - Social Sharing and filtering , Automated Recommendation systems, Traditional Vs. social Recommendation Systems Understanding Social Media and Business Alignment, Social Media KPI, Formulating a Social Media Strategy, Managing Social Media Risks

UNIT VI: Social Media Analytics Applications Social media in public sector - Analysing public sector social media, analysing individual users, case study. Business use of Social Media - Measuring success, Interaction and monitoring, case study

UNIT VII: Social Media Analytics Privacy: Privacy - Privacy policies, data ownership and maintaining privacy online.

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Text Books:

1. Seven Layers of Social Media Analytics_ Mining Business Insights from Social Media Text, Actions, Networks, Hyperlinks, Apps, Search Engine, and Location Data, Gohar F. Khan,(ISBN-10: 1507823207)..

Reference Books:

1. Analyzing the Social Web 1st Edition by Jennifer Golbeck
2. Mining the Social Web_ Analyzing Data from Facebook, Twitter, LinkedIn, and Other Social Media Sites, Matthew A Russell, O'Reilly
3. Charu Aggarwal (ed.), Social Network Data Analytics, Springer, 2011
4. Social Media Analytics [2015], Techniques and Insights for Extracting Business Value Out of Social Media, Matthew Ganis, AvinashKohirkar, IBM Press
5. Social Media Analytics Strategy_ Using Data to Optimize Business Performance, Alex Gonçalves, APress Business Team
6. Social Media Data Mining and Analytics, Szabo, G., G. Polatkan, O. Boykin & A. Chalkiopoulus (2019), Wiley, ISBN 978-1-118-82485-6

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Elective-III Deep Learning

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Basics of Deep leaning- Deep learning architectures, Convolution Neural Networks, Neurons in Human Vision-The Shortcomings of Feature Selection-Vanilla Deep Neural Networks Don't Scale-Filters and Feature Maps-Full Description of the Convolution Layer-Max Pooling-Full Architectural Description of Convolution Networks-Closing the Loop on MNIST with Convolutional Networks-Image Preprocessing Pipelines Enable More Robust Models-Accelerating Training with Batch Normalization

UNIT II: Building a Convolutional Network for CIFAR-10-Visualizing Learning in Convolutional NetworksLeveraging Convolutional Filters to Replicate Artistic Styles-Learning Convolutional Filters for Other Problem Domains-Training algorithms

UNIT III: Memory Augmented Neural Networks : Neural Turing Machines-Attention-Based Memory Access-NTM Memory Addressing Mechanisms-Differentiable Neural Computers-Interference-Free Writing in DNCs-DNC Memory Reuse-Temporal Linking of DNC Writes-Understanding the DNC Read Head-The DNC Controller Network- Visualizing the DNC in Action-Implementing the DNC in TensorFlow-Teaching a DNC to Read and Comprehend

UNIT IV: Deep Reinforcement Learning: Deep Reinforcement Learning Masters Atari Games- What Is Reinforcement Learning?-Markov Decision Processes (MDP)-Explore Versus Exploit-Policy versus Value Learning-Pole-Cart with Policy Gradients-Q-Learning and Deep Q-Networks-Improving and Moving Beyond DQN

UNIT V: Implementing Neural Networks in TensorFlow : What Is TensorFlow?-How Does TensorFlow Compare to Alternatives?-Installing TensorFlow-Creating and Manipulating TensorFlow VariablesTensorFlow Operations-Placeholder Tensors

UNIT VI: Sessions in TensorFlow-Navigating Variable Scopes and Sharing Variables- Managing Models over the CPU and GPU-Specifying the Logistic Regression Model in TensorFlow-Logging and Training the Logistic Regression Model-Leveraging TensorBoard to Visualize

UNIT VII: Computation Graphs and Learning-Building a Multilayer Model for MNIST in TensorFlow. Applications: Deep learning for computer vision, Deep Learning Applications at the Enterprise Scale, Deep Learning Models for Healthcare Applications

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Text Books:

1. "Fundamentals of Deep Learning: Designing Next-Generation Machine Intelligence Algorithms", Nikhil Buduma, Nicholas Locascio, O'Reilly Media, 2017.

Reference Books:

1. "Deep Learning (Adaptive Computation and Machine Learning series", Ian Goodfellow, Yoshua Bengio, Aaron Courville, MIT Press, 2017
2. Deep learning from first principle,2nd edition,tinniam v Ganesh,2018
3. Introduction to Deep Learning ,1st edition, by Eugene charniak,The MIT Press,2019

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Elective-III Business Analytics

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Business statistics- Intro to Probability, Discrete Random Variables- Measures of central tendency-measures of dispersion-correlation methods

UNIT II: Python and R programming- Data Types-Decision Structures-Functions –File operations and Libraries and packages

UNIT III: Managing data resources- types of databases- Big Data NoSQL databases-DataWarehousing and Data mining techniques

UNIT IV: Data science forecasting techniques/tools- Statistical Forecasting Models-Forecasting Models for Stationary Time Series-Forecasting Models for Time Series with a Linear Trend, Forecasting Time Series with Seasonality, Regression Forecasting with Casual Variables, Selecting Appropriate Forecasting Models

UNIT V: Data visualization- Visualization techniques for business data- Line charts-Bar charts-Pie charts-Bubble charts-Histograms-Heatmaps- Scatter plot st-SNE

UNIT VI: Business applications-E-business systems-digital marketing systems-Transactional processing systems-Enterprise Application architecture and integration.Case studies

UNIT VII: Development and security challenges in business analytics Ethical responsibility of Business professionals-Privacy issues-security challenges-Introduction to Access Control, Purpose and fundamentals of access control, brief history.Policies of Access Control, Models of Access Control

Text Books:

1. Ramesh Behl: Business information systems,McGraw Hill..

Reference Books:

1. James Evans:Business Analytics, Pearson Education, 2013.
2. S.C Gupta : Fundamentals of Statistics

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Elective-III High Performance Computing

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction to Parallel Computing: Scope of Parallel Computing, Implicit Parallelism: Trends in Microprocessor Architectures, Limitations of Memory System Performance, Dichotomy of Parallel Computing Platforms, Physical Organization of Parallel Platforms, Communication Costs in Parallel Machines. Taxonomy of parallel computing paradigms, Shared-memory computers, Distributed-memory computers.

UNIT II: Analytical Modelling of Parallel Programs: Sources of Overhead in Parallel Programs, Performance Metrics for Parallel Systems, The Effect of Granularity on Performance, Scalability of Parallel Systems, Minimum Execution Time and Minimum Cost-Optimal Execution Time, Asymptotic Analysis of Parallel Programs

UNIT III: Programming Using the Message-Passing Paradigm: Principles of Message-Passing Programming, The Building Blocks: Send and Receive Operations, MPI: the Message Passing Interface, Topologies and Embedding, Overlapping Communication with Computation, Groups and Communicators

UNIT IV: Distributed-memory parallel programming with MPI: Message passing, A short introduction to MPI, Example: MPI parallelization of a Jacobi solver, MPI performance tools, Communication parameters, Synchronization, serialization, contention, Reducing communication overhead

UNIT V: Shared-memory parallel programming with OpenMP: Short introduction to OpenMP, OpenMP-parallel Jacobi algorithm, Wavefront parallelization, Profiling OpenMP programs, Performance pitfalls, Case study: Parallel sparse matrix-vector multiply

UNIT VI: Locality optimizations on ccNUMA architectures: Locality of access on ccNUMA, Case study: ccNUMA optimization of sparse MVM, Placement pitfalls, ccNUMA issues with C++.

UNIT VII: Parallel Algorithms on Sorting, Dense Matrix Algorithms, Graph Algorithms

Text Books:

1. Georg Hager and Gerhard Wellein. Introduction to High Performance Computing for Scientists and Engineers (1st ed.). CRC Press, Chapman & Hall/CRC Computational Science, India, 2010.

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Reference Books:

1. Vipin Kumar , Ananth Grama , Anshul Gupta , George Karypis. Introduction to Parallel Computing (2nd ed.). Pearson India . 2003.
2. John L. Hennessy and David A. Patterson. Computer Architecture: A Quantitative Approach (5th ed.). Elsevier India Pvt. Ltd. 2011.
3. David B. Kirk and Wen-mei W. Hwu. Programming Massively Parallel Processors: A Hands-On Approach (1st ed.). Elsevier India Pvt. Ltd. 2010.
4. Michael T. Heath. Scientific Computing: An Introductory Survey (2nd ed.). McGraw Hill Education (India) Private Limited

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Elective-IV Geographic Information System

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction to GIS Basic concepts: Definition and history, Components of GIS, Recent trends and applications of GIS; Data structure and formats, Spatial data models – Raster and vector, Data base design- editing and topology creation in GIS, Linkage between spatial and non-spatial data, Data inputting in GIS. Rectification, Transformation Methods; Root Mean Square (RMS) Error.

UNIT II: Data Types and Data Models Data Types; Spatial Data; Non-Spatial Data, Data Input; Existing GIS Data, Metadata; Conversion of Existing Data, Creating New Data, Data Models; Vector Data Model; Raster Data Model; Integration and Comparison of Vector and Raster Data Models

UNIT III: Spatial Data Editing Types of Digitizing Errors, Causes for Digitizing Errors; Topological Editing and Non-topological Editing; Other Editing Operations; Editing Using Topological Rules.

UNIT IV: Attribute Data and Data Exploration Attribute Data in GIS, Attribute Data Entry, Manipulation of Fields and Attribute Data, Data Exploration; Attribute Data Query, Raster Data Query, Map- Based Data Manipulation

UNIT V: Spatial Analysis Spatial Data: Definition, Analysis, Processes & Steps, Software and Tools, Geodatabase Model, Role of Databases in GIS, Creating, Editing and Managing, Classification scheme of Vector- Based and Raster- Based GIS Operation Raster- Based Techniques: Methods of reclassification, overlay analysis, Digital Terrain Analysis and Modeling- TIN and DEM, Surface representation and analysis, Slope and Aspect, Geographic Visualization Data Classification, Map Comparison

UNIT VI: Geo Statistical Analysis Techniques: Introduction to Spatial Interpolation: Control Points, Global Method- Trend surface analysis, regression model, local methods- Thiessen polygons, density estimation, Inverse Distance weighted Interpolation, Kriging- Ordinary Kriging and Universal Kriging, GIS and decision support system, Introduction to AHP, basic principal of AHP. Principal and components of multiple criteria decision making.

Text Books:

1. kang-tsung Chang (2007), 'Introduction to Geographic Information Systems' Tata MCGraw Hill, New Delhi.

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Reference Books:

1. C.P.Lo and Albert K.W. Yeung (2006) "Concepts and Techniques of Geographic information Systems" Prentice Hall of India, New Delhi
2. Burrough, Peter A. and Rachael McDonnell, (1998), 'Principles of Geographical Information Systems' Oxford University press, New York.
3. Magwire, D.J. Goodchild, M.F. and Rhind, D.M., (2005), 'Geographical Information Systems: Principles and Applications', Longman Group, U.K.
4. Burrough, P.A., 1986, Geographical Information System for land Resources System, Oxford Univ. Press, UK.
5. Fotheringham, S.; Rogerson, P. (ed.), 1994. Spatial analysis and GIS. Taylor and Francis, London, UK.
6. Laurini, Robert and Dierk Thompson, 1992, Fundamentals of Spatial Information Systems, Academics Press, ISBN 0-12-438380-7.
7. Maguire,D.J.; Goodchild, M.F.; Rhind,D.W. 1991.Geographical information System, Longman, London,UK
8. Siddiqui, M.A.; 2006, Introduction to Geographical Information System, Sharda Pustak Bhavan, Allahabad.
9. Siddiqui, M.A.; 2011, Concepts and Techniques of Geoinformatics, Sharda Pustak Bhavan, Allahabad.

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Elective-IV Block Chain Technology

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction: Scenarios, Challenges Articulated, Blockchain, Blockchain Characteristics, Opportunities Using Blockchain, History of Blockchain.
Evolution of Blockchain: Evolution of Computer Applications, Centralized Applications, Decentralized Applications, Stages in Blockchain Evolution, Consortia, Forks, Public Blockchain Environments, Type of Players in Blockchain Ecosystem, Players in Market.

UNIT II: Blockchain Concepts: Introduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on blockchain, data storage on blockchain, wallets, coding on blockchain: smart contracts, peer-to-peer network, types of blockchain nodes, risk associated with blockchain solutions, life cycle of blockchain transaction

UNIT III: Architecting Blockchain solutions: Introduction, Obstacles for Use of Blockchain, Blockchain Relevance Evaluation Framework, Blockchain Solutions Reference Architecture, Types of Blockchain Applications, Cryptographic Tokens, Typical Solution Architecture for Enterprise Use Cases, Types of Blockchain Solutions, Architecture Considerations, Architecture with Blockchain Platforms, Approach for Designing Blockchain Applications

UNIT IV: Ethereum Blockchain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts, MyEtherWallet, Ethereum Networks/Environments, Infura, Etherscan, Ethereum Clients, Decentralized Application, Metamask, Tuna Fish Use Case Implementation, OpenZeppelinContract

UNIT V: Hyperledger Blockchain Implementation: Introduction, Use Case — Car Ownership Tracking, Hyperledger Fabric, Hyperledger Fabric Transaction Flow, FabCar Use Case Implementation, Invoking Chaincode Functions Using Client Application

UNIT VI: Advanced Concepts in Blockchain: Introduction, InterPlanetary File System (IPFS), Zero-Knowledge Proofs, Oracles, Self-Sovereign Identity, Blockchain with 10T and Al/ML Quantum Computing and Blockchain, Initial Coin Offering, Blockchain Cloud Offerings, Blockchain and its Future Potential.

UNIT VII: Technical challenges, Business model challenges, Scandals and Public perception, Government Regulations, Uses of Block chain in E-Governance, Land Registration, Medical Information Systems.

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Text Books:

1. "Blockchain for Enterprise Application Developers", Ambadas, Arshad SarfarzAriff, Sham Wiley.

Reference Books:

1. "Mastering Bitcoin: Programming the Open Blockchain", Andreas M. Antonpoulos,O'Reilly
2. Blockchain: A Practical Guide to Developing Business, Law, and Technology Solutions, Joseph Bambara, Paul R. Allen, Mc GrawHill.
3. Blockchain: Blueprint for a New Economy, Melanie Swan,O'Reilly

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Elective-IV Secure Software Design

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Secure Software Design Identify software vulnerabilities and perform software security analysis, Master security programming practices, Master fundamental software security design concepts, Perform security testing and quality assurance.

UNIT II: Enterprise Application Development Describe the nature and scope of enterprise software applications, Design distributed N-tier software application, Research technologies available for the presentation, business and data tiers of an enterprise software application, Design and build a database using an enterprise database system, Develop components at the different tiers in an enterprise system, Design and develop a multi-tier solution to a prob

UNIT III: Enterprise Systems Administration Design, implement and maintain a directory-based server infrastructure in a heterogeneous systems environment, Monitor server resource utilization for system reliability and availability, Install and administer network services (DNS/DHCP/Terminal Services/Clustering/Web/Email).

UNIT IV: Enterprise Network Obtain the ability to manage and troubleshoot a network running multiple services, Understand the requirements of an enterprise network and how to go about managing them

UNIT V: Defending Applications Handle insecure exceptions and command/SQL injection, Defend web and mobile applications against attackers, software containing minimum vulnerabilities and flaws

Text Books:

1. Theodor Richardson, Charles N Thies, Secure Software Design, Jones & Bartlett.

Reference Books:

1. Kenneth R. van Wyk, Mark G. Graff, Dan S. Peters, Diana L. Burley, Enterprise Software Security, Addison Wesley

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Elective-IV Data Storage Technologies and Networks

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Storage Media and Technologies – Magnetic, Optical and Semiconductor Media, Techniques for read/write Operations, Issues and Limitations.

UNIT II: Usage and Access – Positioning in the Memory Hierarchy, Hardware and Software Design for Access, Performance issues

UNIT III: Large Storages – Hard Disks, Networked Attached Storage, Scalability issues, Networking issues

UNIT IV: Storage Architecture - Storage Partitioning, Storage System Design, Caching, Legacy Systems

UNIT V: Storage Area Networks – Hardware and Software Components, Storage Clusters/Grids. Storage QoS– Performance, Reliability and Security issues

Text Books:

1. The Complete Guide to Data Storage Technologies for Network-centric Computing Paperback– Import, Mar 1998 by Computer Technology Research Corporation

Reference Books:

1. Data Storage Networking: Real World Skills for the CompTIA Storage by Nigel Poulton

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Elective-IV INFORMATION RETRIEVAL SYSTEMS

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Introduction to Information Retrieval: Motivation, Information Retrieval vs Data Retrieval, Domain Analysis of IR systems, The retrieval process. **Introduction to Data Structures and Algorithms related to Information Retrieval**: Basic Concepts, Data structures, Algorithms.**IR System Evaluation**: Recall and Precision, Alternative Measures, Reference Collections and Evaluation of IR systems.

UNIT II: Modelling: Classic information retrieval models- Boolean Model, Vector Space Model, Probabilistic Model, Alternative Models, and Comparison

UNIT III: Query Languages for IR: Introduction, Key words based: Single word, Boolean Queries, Context Queries, Natural Language Queries, Structural Queries

UNIT IV: Text Processing: Document Processing, Text Comparison.
Stemming Algorithms: Introduction, Types of Stemming Algorithms, Experimental Evaluations of Stemming to Compress Inverted Files
Thesaurus Construction: Introduction, Features of Thesauri, Thesaurus Construction, Thesaurus construction from Texts, Merging existing Thesauri

UNIT V: Indexing: Introduction, Inverted files, PAT Trees, Signature files.
Inverted files- Introduction, Structures used in Inverted Files, Building Inverted file using a sorted array, Modifications to Basic Techniques.

UNIT VI: New Indices for Text: PAT Trees and PAT Arrays: Introduction, PAT Tree structure, algorithms on the PAT Trees, Building PAT trees as PATRICA Trees, PAT representation as arrays

UNIT VII: Signature Files: Introduction, Concepts of Signature Files, Compression, Vertical Partitioning, Horizontal Partitioning

Text Books:

1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992..

Reference Books:

1. Modern Information Retrieval by Yates Pearson Education.
2. Information Storage & Retrieval by Robert Korfhage – John Wiley & Sons Kowalski, Gerald, Mark T Maybury: Information Retrieval Systems: Theory and Implementation, Kluwer Academic Press, 1997.
3. Information retrieval Algorithms and Heuristics, 2ed, Springer

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MACHINE LEARNING LAB

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 3**
Internal: 50 Marks	**External: 50 Marks**	**Total: 100 Marks**

List of Experiments:

1. Implement Principal Component Analysis (PCA) and Singular Value Decomposition (SVD) using NumPy
2. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
3. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.
4. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
5. Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.
6. Write a program to implement the naïveBayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
7. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.
8. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.
9. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.

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10. Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.
11. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.
12. Create the following plots using Matplotlib, Pandas Visualization, Seaborn on iris dataset, wine reviews datasets.
    a) Scatter Plot
    b) Line chart
    c) Histogram
    d) Heatmap

Text Books:

1. Hands–On Machine Learning with Scikit–Learn and TensorFlow 2e: Concepts, Tools, and Techniques to Build Intelligent Systems, AurelienGeron, 2019.

Reference Books:

1. https://scikit-learn.org/stable/tutorial/index.html
2. https://archive.ics.uci.edu/ml/index.php
3. https://towardsdatascience.com/pca-and-svd-explained-with-numpy-5d13b0d2a4d8
4. https://towardsdatascience.com/introduction-to-data-visualization-in-python-89a54c97fbed

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Annexure-XXXVI

Data Visualization using Tableau Lab

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 2**
Internal: 50 Marks	**External: 50 Marks**	**Total: 100 Marks**

List of Experiments:

Module 1: Tableau Course Material

- Start Page
- Show Me
- Connecting to Excel Files
- Connecting to Text Files
- Connect to Microsoft SQL Server
- Connecting to Microsoft Analysis Services
- Creating and Removing Hierarchies
- Bins
- Joining Tables
- Data Blendin

Module 2: Learn Tableau Basic Reports

- Parameters
- Grouping Example 1
- Grouping Example 2
- Edit Groups
- Set
- Combined Sets
- Creating a First Report
- Data Labels
- Create Folders
- Sorting Data
- Add Totals, Sub Totals and Grand Totals to Report

Module 3: Learn Tableau Charts

- Area Chart
- Bar Chart
- Box Plot
- Bubble Chart
- Bump Chart
- Bullet Graph
- Circle Views
- Dual Combination Chart

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- Dual Lines Chart
- Funnel Chart
- Traditional Funnel Charts
- Gantt Chart
- Grouped Bar or Side by Side Bars Chart
- Heatmap
- Highlight Table
- Histogram
- Cumulative Histogram
- Line Chart
- Lollipop Chart
- Pareto Chart
- Pie Chart
- Scatter Plot
- Stacked Bar Chart
- Text Label
- Tree Map
- Geographic map

Module 4: Custom SQL

- Convert to Custom SQL

Module 5: Learn Tableau Advanced Reports

- Dual Axis Reports
- Blended Axis
- Individual Axis
- Add Reference Lines
- Reference Bands
- Reference Distributions
- Basic Maps
- Symbol Map
- Use Google Maps

Module 6: Learn Tableau Calculations & Filters

- Calculated Fields
- Basic Approach to Calculate Rank
- Advanced Approach to Calculate Rank
- Calculating Running Total
- Filters Introduction
- Quick Filters
- Filters on Dimensions

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- Conditional Filters
- Top and Bottom Filters
- Filters on Measures
- Context Filters
- Slicing Filters
- Data Source Filters
- Extract Filters

Module 7: Learn Tableau Dashboards

- Create a Dashboard
- Format Dashboard Layout
- Create a Device Preview of a Dashboard
- Create Filters on Dashboard
- Dashboard Objects
- Create a Story

Module 8: Tableau data server

- Physical architecture overview
- User access
- Component functions & processes
- Tableau server on-premises
- Tableau reader
- Tableau online v tableau server

Module 9: Tableau Server UI

- Tableau server user interface
- Users
- Site roles
- Groups
- Schedules
- Tasks
- Tableau server menu
- Content display options

Text Books:

1. Fundamentals of Data Visualization, Claus O. Wilke, O'Reilly
2. Tableau Data Visualization Cookbook, Ashutosh Nandeshwar, Packt Publishing

Reference Links:

1. https://archi ableau Data Visualization Cookbook ve.ics.uci.edu/ml/index.php
2. https://www.coursera.org/specializations/data-visualization

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(Autonomous)
(Approved by AICTE, New Delhi and Permanently Affiliated to Andhra University, Visakhapatnam)
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Annexure-12

ANNEXURE - IX

ANALOG AND DIGITAL CMOS VLSI DESIGN
I Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

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Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Understand the concepts of MOS Devices and Modeling
CO2:	Analyze the CMOS sub circuits
CO3:	Illustrate the concepts of MOS Design and compare the characteristics of a Psuedo-nMOS and CMOS Inverter.
CO4:	Design and analysis of Combinational Circuits using NMOS logic, CMOS logic and Transmission gate logic.
CO5:	Design and analysis of Sequential Circuits using nMOS logic, CMOS logic and Transmission gate logic.

UNIT-I

Technology Scaling and Road map, Scaling issues, Standard 4 mask NMOS Fabrication process

Digital CMOS Design:

Basic MOS structure and its static behavior, Quality metrics of a digital design: Cost, Functionality, Robustness, Power, and Delay, Stick diagram and Layout, Wire delay models. Inverter: Static CMOS inverter, Switching threshold and noise margin concepts and their Evaluation, Dynamic behavior, Power consumption.

UNIT-II

Physical design flow

Floor planning, Placement, Routing, CTS, Power analysis and IR drop estimation-static and dynamic, ESD protection-human body model, Machine model. Combinational logic: Static CMOS design, Ratioed logic, Pass transistor logic, Dynamic logic, Speed and power dissipation in dynamic logic, Cascading dynamic gates, CMOS transmission gate logic.

UNIT-III

Sequential logic

Static latches and registers, Bi-stability principle, MUX based latches, Static SR flip-flops, Master-slave edge-triggered register, Dynamic latches and registers, Concept of pipelining, ulse registers, non-bistable sequential circuit. Advanced technologies: Giga-scale dilemma, short channel effects, High–k, Metal Gate Technology, FinFET, TFET etc.

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UNIT-IV
Analog CMOS Design: Single Stage Amplifier CS stage with resistance load, Divide connected load, Current source load, Triode load, CS stage with source degeneration, Source follower, Common gate stage, Cascade stage, Choice of device models. Differential Amplifiers: Basic difference pair, Common mode response, Differential pair with MOS loads, Gilbert cell.

UNIT-V
Passive and active current mirrors Basic current mirrors, Cascade mirrors, Active current mirrors. Frequency response of CS stage: Source follower, Common gate stage, Cascade stage and difference pair, Noise. Operational amplifiers: One stage OPAMP.

Text Books:
1. J P Rabaey, A P Chandrakasan, B Nikolic, "Digital Integrated circuits: A design perspective", Prentice Hall electronics and VLSI series, 2nd Edition. 2. Baker, Li, Boyce, "CMOS Circuit Design, Layout, and Simulation", Wiley, 2nd Edition. 3. Behzad Razavi, "Design of Analog CMOS Integrated Circuits", TMH, 2007.
Reference Books:
1. Phillip E. Allen and Douglas R. Holberg, "CMOS Analog Circuit Design", Oxford, 3rd Edition. 2. R J Baker, "CMOS circuit Design, Layout and Simulation", IEEE Inc., 2008. 3. Kang, S. and Leblebici, Y., "CMOS Digital Integrated Circuits, Analysis and Design", TMH, 3rdEdition. 4. Pucknell, D.A. and Eshraghian, K., "Basic VLSI Design", PHI, 3rd Edition.

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ANNEXURE - X

EMBEDDED SYSTEMS DESIGN
I Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Analyze the quality principles and tools in embedded system during product development process and Design interface circuit with processor and memory devices.
CO2:	Understand the architectural and programming concepts of ARM controllers.
CO3:	Compare and select ARM processor core based SoC with several features/peripherals based on requirements of embedded applications.
CO4:	Develop software programs to control embedded system using C
CO5:	Develop software programs to control embedded system using Python Languages.

UNIT-I

Introduction to Embedded Electronic Systems and Microcontrollers:
An Embedded System-Definition, Embedded System Design and Development Life Cycle, An Introduction to Embedded system Architecture, The Embedded Systems Model, Embedded Hardware: The Embedded Board and the von Neumann Model, Embedded Processors: ISA Architecture Models, Internal Processor Design, Processor Performance, Board Memory: Read-Only Memory (ROM), Random-Access Memory (RAM), Auxiliary Memory, Memory Management of External Memory and Performance, Approaches to Embedded Systems, Small Microcontrollers, Anatomy of a Typical Small Microcontroller, Small Microcontrollers Memory, Embedded Software

UNIT-II

ARM Embedded Systems
The RISC Design Philosophy, The ARM Design Philosophy, Embedded System Hardware, Embedded System Software, ARM processor Families, Core extensions, Architecture Revisions.

UNIT-III

ARM Cortex-M3 processor: Applications, Programming model – Registers, Operation modes, Exceptions and Interrupts, Reset Sequence Instruction Set, Unified Assembler Language,
Memory Maps, Memory Access Attributes, Permissions, Bit-Band Operations, Unaligned and Exclusive Transfers. Pipeline, Bus Interfaces

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UNIT-IV

Embedded C

Introduction to Embedded C - Difference between C & Embedded C - Programming style - Basic structure of C program- Keywords & Identifiers - Data type & its memory representation - Arrays and strings- Types of Operators - Bitwise Operators - Control Structures – Loops - Functions.

UNIT-V

Python Programming

Basics of PYTHON Programming Syntax and Style – Python Objects– Dictionaries – comparison with C programming on Conditionals and Loops – Files – Input and Output – Errors and Exceptions – Functions – Modules – Classes and OOP – Execution Environment.

Text Books:

1. Tammy Noergaard "Embedded Systems Architecture: A Comprehensive Guide for Engineers and Programmers", Elsevier (Singapore) Pvt. Ltd. Publications, 2005.
2. David. E. Simon, "An Embedded Software Primer", Pearson Education, 2001.
3. Rajkamal, "Embedded Systems: Architecture, Programming and Design", TMH Publications, Second Edition, 2008.
4. Joseph Yiu, "The definitive guide to ARM Cortex-M3", Elsevier, 2nd Edition

Reference Books:

1 Michael J Pont, "Embedded C", Pearson Education, 2007.
2. Jivan S. Parab, Vinod G. Shelake, Rajanish K.Kamot, and Gourish M.Naik, "Exploring C for Microcontrollers- A Hands on Approach", Springer, 2007.
3. Mark Lutz, "Learning Python Powerful OOPs",O'reilly,2011.
4. Peter Barry, Patrick Crowley, "Modern Embedded Computing" Morgan Kaufmann Publishers, 2012.
5. Sloss Andrew N, Symes Dominic, Wright Chris, "ARM System Developer's Guide: Designing and Optimizing", Morgan Kaufman Publication

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ANNEXURE - XI

Elective I
APPLICATION SPECIFIC INTEGRATED CIRCUITS (ASIC)
I Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Architect ASIC library design
CO2:	Develop programmable ASIC logic cells
CO3:	Design I/O cells and interconnects
CO4:	Identify new developments in SOC and low power design.
CO5:	design cell design

UNIT-I

Introduction to ASICs – Types of ASICs, Design flow, Economics of ASICs, ASIC Cell Libraries, CMOS Logic, CMOS Design Rules, Logic Cells, I/O Cells, Cell Compilers.

UNIT-II

ASIC Library Design – Transistors as resistors, Transistor Parasitic Capacitance, Logical Effort, Cell Design, Programmable ASICs, Programmable ASIC Logic Cells, Programmable ASIC I/O Cells, Programmable ASIC Interconnect, Programmable ASIC Design Software.

UNIT-III

Low-level Design Entry, Schematic Entry, Low-Level Design Languages, PLA Tools, EDIF, An overview of VHDL and Verilog, Logic Synthesis, Simulation. ASIC Construction, Floor Planning and Placement.

UNIT-IV

CMOS System Core Studies: Dynamic Warp Processors: Introduction, The Problem, The Algorithm, A Functional Overview, Detailed Functional Specification, Structural Floor Plan, Physical Design, Fabrication, Hierarchical Layout and Design Of Single Chip 32 Bit CPU: Introduction, Design Methodology, Technology Updatability And Layout Verification.

UNIT-V

Practical Realities and Ground Rules: Further Thoughts on Floor Plans/Layout, Floor Plan Layout of The Four Bit Processors, Input/output (I/O) Pads, "Real estate", Further Thoughts on System Delays, Ground Rules for Successful Design, Scaling of MOS Circuits.

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Text Books:
1.Application Specific Integrated Circuits by J.S. Smith, Addison Wesley, 1997.
Reference Books:
1.Basic VLSI Design : Systems and Circuits, Doublas A. Pucknell& Kamran Eshraghian, Prentice Hall of India Private Ltd., New Delhi, 1989. 2. VLSI Design Techniques for analog and digital circuits, R.L. Geiger, P.E. Allen & N.R. Streder, McGraw Hill Int. 1990.

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ANNEXURE - XII

Elective I
ADVANCED OPERATING SYSTEMS
I Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Understand the objectives of computer system architecture, instruction execution, I/O functions, memory hierarchy, and operating system.
CO2:	Apply basic commands, I/O redirection, filters, editors, and shell operations in a Unix/Linux environment.
CO3:	Understand the concept of system calls, process management, and inter-process communication techniques like pipes, semaphores, and sockets.
CO4:	Outline the goals, design issues, and communication models in distributed systems.
CO5:	Apply synchronization techniques and deadlock management strategies in distributed systems.

UNIT-I

Introduction to Operating Systems
Overview of computer system hardware, Instruction execution, I/O function, Interrupts, Memory hierarchy, I/O Communication techniques, Operating system objectives and functions, Evaluation of operating System.

UNIT-II

Introduction to UNIX and LINUX
Basic Commands & Command Arguments, Standard Input, Output, Input / Output Redirection, Filters and Editors, Shells and Operations.

UNIT-III

System Calls: System calls and related file structures, Input / Output, Process creation & termination.
Inter Process Communication: Introduction, File and record locking, Client – Server example, Pipes, FIFOs, Streams & Messages, Name Spaces, Systems V IPC, Message queues, Semaphores, Shared Memory, Sockets & TLI.

UNIT-IV

Introduction to Distributed Systems:
Goals of distributed system, Hardware and software concepts, Design issues.
Communication in Distributed Systems:
Layered protocols, ATM networks, Client - Server model, Remote procedure call and Group communication.

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UNIT-V
Synchronization in Distributed Systems: Clock synchronization, Mutual exclusion, E-tech algorithms, Bully algorithm, Ring algorithm, Atomic transactions **Deadlocks:** Dead lock in distributed systems, distributed dead lock prevention and distributed dead lock detection.

Text Books:
1.The Design of the UNIX Operating Systems – Maurice J. Bach, 1986, PHI. 2. Distributed Operating System - Andrew. S. Tanenbaum, 1994, PHI. 3. The Complete Reference LINUX – Richard Peterson, 4th Ed., McGraw – Hill.
Reference Books:
1.Operating Systems: Internal and Design Principles - Stallings, 6th Ed., PE. 2. Modern Operating Systems - Andrew S Tanenbaum, 3rd Ed., PE. 3. Operating System Principles - Abraham Silberchatz, Peter B. Galvin, Greg Gagne, 7th Ed., John Wiley 4. UNIX User Guide – Ritchie & Yates. 5. UNIX Network Programming - W.Richard Stevens, 1998, PHI.

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ANNEXURE - XIII

Elective I
PARALLEL PROCESSING
I Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Outline the concepts of parallel processing and pipelining systems.
CO2:	Classify pipelining processors and illustrate advanced pipelining techniques.
CO3:	Build various architectures for VLIW processors.
CO4:	Make use of latency hiding techniques for implementing multithreaded processors
CO5:	Analyze parallel programming techniques and operating systems for multiprocessors customizing applications.

UNIT-I
Overview of Parallel Processing and Pipelining, Performance analysis, Scalability.

UNIT-II
Principles and implementation of Pipelining, Classification of pipelining processors, Advanced pipelining techniques, Software pipelining.

UNIT-III
VLIW processors Case study: Superscalar Architecture- Pentium, Intel Itanium Processor, Ultra PARC, MIPS on FPGA, Vector and Array Processor, FFT Multiprocessor Architecture.

UNIT-IV
Multithreaded Architecture, Multithreaded processors, Latency hiding techniques, Principles of Multithreading, Issues and solutions.

UNIT-V
Parallel Programming Techniques: Message passing program development, Synchronous and asynchronous message passing, Shared Memory Programming, Data Parallel Programming, Parallel Software Issues. Operating systems for multiprocessors systems Customizing applications on parallel processing platforms

Text Books:
1. Kai Hwang, Faye A. Briggs, "Computer Architecture and Parallel Processing", MGH International Edition

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2. Kai Hwang, "Advanced Computer Architecture", TMH
3. V. Rajaraman, L. Sivaram Murthy, "Parallel Computers", PHI.

Reference Books:

1. William Stallings, "Computer Organization and Architecture, Designing for performance "Prentice Hall, Sixth edition
2. Kai Hwang, ZhiweiXu, "Scalable Parallel Computing", MGH
3. David Harris and Sarah Harris, "Digital Design and Computer Architecture", Morgan

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ANNEXURE - XIV

Elective II
CPLD AND FPGA ARCHITECTURES AND APPLICATIONS
I Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Understand the features and architectures of industrial CPLDs with different families.
CO2:	Understand the features and architectures of industrial FPGAs with different families.
CO3:	Know the programming techniques used in FPGA design methodology.
CO4:	Design and implement complex real time digital circuits.
CO5:	Analyze the behavior of Integrated digital applications

UNIT-I

Introduction to Programmable Logic Devices

Introduction, Simple Programmable Logic Devices – Read Only Memories, Programmable Logic Arrays, Programmable Array Logic, Programmable Logic Devices/Generic Array Logic; Complex Programmable Logic Devices – Architecture of Xilinx Cool Runner XCR3064XL CPLD, CPLD Implementation of a Parallel Adder with Accumulation.

UNIT-II

Field Programmable Gate Arrays

Organization of FPGAs, FPGA Programming Technologies, Programmable Logic Block Architectures, Programmable Interconnects, Programmable I/O blocks in FPGAs, Dedicated Specialized Components of FPGAs, Applications of FPGAs.

UNIT-III

SRAM Programmable FPGAs

Introduction, Programming Technology, Device Architecture, The Xilinx XC2000, XC3000 and XC4000 Architectures.

UNIT-IV

Anti-Fuse Programmed FPGAs

Introduction, Programming Technology, Device Architecture, The Actel ACT1, ACT2 and ACT3 Architectures.

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UNIT-V
Design Applications General Design Issues, Counter Examples, A Fast Video Controller, A Position Tracker for a Robot Manipulator, A Fast DMA Controller, Designing Counters with ACT devices, Designing Adders and Accumulators with the ACT Architecture.

Text Books:
1. Field Programmable Gate Array Technology - Stephen M. Trimberger, Springer International Edition. 2. Digital Systems Design - Charles H. Roth Jr, Lizy Kurian John, Cengage Learning.
Reference Books:
1. Field Programmable Gate Arrays - John V. Oldfield, Richard C. Dorf, Wiley India. 2. Digital Design Using Field Programmable Gate Arrays - Pak K. Chan/Samiha Mourad, Pearson Low Price Edition. 3. Digital Systems Design with FPGAs and CPLDs - Ian Grout, Elsevier, Newnes. 4. FPGA based System Design - Wayne Wolf, Prentice Hall Modern Semiconductor Design Series.

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ANNEXURE - XV

Elective II
ELECTRONIC DESIGN AUTOMATION TOOLS
I Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Design software system models in a suitable system-level modeling language
CO2:	Make use of functional models into hardware and software components
CO3:	Construct models Using effective optimization techniques
CO4:	Compare the complexity and efficiency of various algorithms at high level and low level
CO5:	Analyze the behaviour of Mixed signal Digital Applications

UNIT-I

IMPORTANT CONCEPTS IN VERILOG:
Basics Of Verilog Language, Operators, Hierarchy, Procedures and Assignments, Timing Controls and Delay. Tasks And Functions Control Statements, Logic-Gate Modeling, Modeling Delay, Altering Parameters, other Verilog Features.

UNIT-II

SYNTHESIS AND SIMULATION USING HDLS:
Verilog And Logic Synthesis. VHDL And Logic Synthesis, Memory Synthesis, FSM Synthesis, Memory Synthesis, Performance-Driven Synthesis.
Simulation-Types of Simulation, Logic Systems Working of Logic Simulation, Cell Models, Delay Models State Timing Analysis, Formal Verification, Switch-Level Simulation Transistor-Level Simulation. CAD Tools For Synthesis and Simulation Model sim And Leonardo Spectrum (Exemplar).

UNIT-III

TOOLS FOR CIRCUIT DESIGN AND SIMULATION USING HSPICE:
HSPICE net list implementation,Hspice GUI for windows, DC and Operating point analysis,MOSFET behavioral modeling,Verilog-A modeule setup.

UNIT-IV

AN OVER VIEW OF MIXED SIGNAL VLSI DESIGN:
Fundamentals Of Analog and Digital Simulation, Mixed Signal Simulator Configurations, Understanding Modeling, Integration To CAE Environments, Analyses Of Analog Circuits Eg. A/D, D/A Converters, Up And Down Converters, Companders Etc.

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UNIT-V
TOOLS FOR LAYOUT IMPLEMENTATION: An overview of Schematic generation,DRC verification,LVS generation,PEX implementation,GDSII verification.

Text Books:
1. J.Bhaskar, A Verilog Primer, BSP, 2003. 2. J.Bhaskar, A Verilog HDL Synthesis BSP, 2003
Reference Books:
1. HSpice user guide simulation and Analysis 2. SABER: Technical Reference Manual, Analogy Nic, USA. 3. M.J.S.SMITH :Aplication-Specific Integrated Circuits(1997). Addison Wesley 4. "Digital VLSI Systems Design: A Design Manual for Implementation of Projects on FPGAs and ASICs Using Verilog" by Seetharaman Ramachandra.

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ANNEXURE - XVI

Elective II
DIGITAL SYSTEM DESIGN
I Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Apply CAMP algorithm for minimization of switching functions
CO2:	Make use of IISc and Compact algorithms in the development of minimized PLAs
CO3:	Develop Programmable Logic Devices using ASM charts
CO4:	Analyze various techniques for fault diagnosis in combinational circuits
CO5:	Analyze various techniques for fault diagnosis in sequential circuits

UNIT-I

Minimization Procedures and CAMP Algorithm

Review on minimization of switching functions using tabular methods, k-map, QM algorithm, CAMP-I algorithm, Phase-I: Determination of Adjacencies, DA, CSC, SSMs and EPCs,, CAMPI algorithm, Phase-II: Passport checking, Determination of SPC, CAMP-II algorithm: Determination of solution cube, Cube based operations, determination of selected cubes are wholly within the given switching function or not, Introduction to cube based algorithms.

UNIT-II

PLA Design, PLA Minimization and Folding Algorithms

Introduction to PLDs, basic configurations and advantages of PLDs, PLA-Introduction, Block diagram of PLA, size of PLA, PLA design aspects, PLA minimization algorithm (IISc algorithm), PLA folding algorithm (COMPACT algorithm)-Illustration of algorithms with suitable examples.

UNIT-III

Design of Large-Scale Digital Systems

Algorithmic state machine charts-Introduction, Derivation of SM Charts, Realization of SM Chart, control implementation, control unit design, data processor design, ROM design, PAL design aspects, digital system design approaches using CPLDs, FPGAs and ASICs.

UNIT-IV

Fault Diagnosis in Combinational Circuits

Faults classes and models, fault diagnosis and testing, fault detection test, test generation, testing process, obtaining a minimal complete test set, circuit under test methods- Path sensitization method, Boolean difference method, properties of Boolean differences, Kohavi algorithm, faults in PLAs, DFT schemes, built in self-test.

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UNIT-V
Fault Diagnosis in Sequential Circuits Fault detection and location in sequential circuits, circuit test approach, initial state identification, Haming experiments, synchronizing experiments, machine identification, distinguishing experiment, adaptive distinguishing experiments.

Text Books:
1. Logic Design Theory-N. N. Biswas, PHI 2. Switching and Finite Automata Theory-Z. Kohavi , 2nd Edition, 2001, TMH 3. Digital system Design using PLDd-Lala
Reference Books:
1. Fundamentals of Logic Design – Charles H. Roth, 5th Ed., Cengage Learning. 2. Digital Systems Testing and Testable Design – Miron Abramovici, Melvin A.Breuer and Arthur D. Friedman- John Wiley & Sons Inc.

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ANNEXURE - XVII

ANALOG AND DIGITAL CMOS VLSI DESIGN LAB

I Year M. Tech. I semester

(Branch: VLSI Design & Embedded Systems)

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Develop different Analog Applications
CO2:	Analyze the functional behaviour of analog circuits and determine performance metrics
CO3:	Develop different digital Applications
CO4:	Analyze the functional behaviour of digital circuits and determine performance metrics
CO5:	Construct layout and GDSII implementation of digital circuits

The students are required to design and implement the Circuit and Layout of any **TEN** Experiments using CMOS 130nm Technology with Mentor Graphics Tool/Cadence/ Synopsys/Industry Equivalent Standard Software.

List of Experiments:

1. MOS Device Characterization and parametric analysis
2. Common Source Amplifier
3. Cascode amplifier
4. Cascode current mirror.
5. Wilson current mirror.
6. Full Adder
7. RS-Latch
8. Clock Divider
9. JK-Flip Flop
10. Synchronous Counter
11. Asynchronous Counter
12. Static RAM Cell

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ANNEXURE - XVIII

EMBEDDED SYSTEMS DESIGN LAB

I Year M. Tech. I semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Develop and execute Assembly Language Programs for arithmetic and bit manipulation on ARM Cortex M3.
CO2:	Interface and control hardware components like motors and DACs using Embedded C on an ARM Cortex M3 evaluation board.
CO3:	Utilize UART for serial communication and message display in Embedded C on ARM Cortex M3.
CO4:	Implement external interrupts to control LEDs and other outputs using Embedded C.
CO5:	Interface with sensors and read data using SPI ADC ICs on an ARM Cortex M3 evaluation board.

PART-A:

(Conduct the following experiments by writing Assembly Language Program (ALP) using ARM Cortex M3 Registers using an evaluation board/simulator and the required software tool.)

1. ALP to multiply two 16-bit binary numbers.
2. ALP to find the sum of first 10 integers.
3. ALP to find the number of 0's and 1's in a 32-bit data.
4. ALP to determine the given 16-bit number is ODD or EVEN.
5. ALP to write data in RAM.

PART-B:

(Conduct any **Five** experiments on an ARM CORTEX M3 evaluation board using evaluation version of Embedded 'C' &Keil Uvision-4tool/compiler.)

6. Display "Hello World" message using Internal UART.
7. Interface and Control a DC Motor.
8. Interface a Stepper motor and rotate it in clockwise and anti-clockwise direction.
9. Interface a DAC and generate Triangular and Square waveforms.
10. Interface a 4x4 keyboard and display the key code on an LCD.
11. Demonstrate the use of an external interrupt to toggle an LED On/Off.
12. Display the Hex digits 0 to F on a 7-segment LED interface, with an appropriate delay in between.
13. Measure Ambient temperature using a sensor and SPI ADC IC.

Beyond Syllabus:

1. Using the Internal PWM module of ARM controller generate PWM and vary its duty cycle.
2. Interface a simple Switch and display its status through Relay, Buzzer and LED.

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ANNEXURE - XIX

RTL DESIGN & VERIFICATION USING SYSTEM VERILOG

I Year M. Tech. II semester

(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Understand the importance of System Verilog
CO2:	Develop conditional constructs based digital applications using System Verilog
CO3:	Develop object oriented Programming(OOP) based digital applications
CO4:	Develop digital Applications using System Verilog
CO5:	Analyze functional coverage using System Verilog

UNIT-I

Introduction to System Verilog

Concepts of top-down design, Overview of RTL models, Overview of gate/switch models, The RTL design flow with simulation and synthesis, writing verification test benches in Verilog, running your preferred Verilog simulator, Debugging designs with simulation. Identifier names, Logic values and numbers, Data types and 2-state vs. 4-state guidelines, Enumerated types, User-defined types, Casting (Static and Dynamic). Structure and unions declarations and their element access. Dynamic arrays, Associative arrays, Queues and Strings

UNIT-II

System Verilog Interfaces, Packages and Compound types

Using interfaces to simplify inter-module connections, Mod ports in Interface, Clocking Blocking in interface, Transforming Verilog code into System Verilog using package, interface mod port and clocking block, Using tasks and functions in interfaces, Interfaces as an RTL modelling construct, Package declaration, Element access in package. System Verilog test bench using basic constructs, Program and Final block.

UNIT-III

System Verilog Procedural blocks and Assignments:

Procedural blocks, System Verilog enhanced procedural blocks, Blocking and non- blocking assignments, Continuous assignments, Programming statements – if else, case, case X, case Z, unique if, priority if, unique case, priority case. Operators and language rules, Loops: forever, for each, repeat, while do while and for loop.

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UNIT-IV

System Verilog Process Synchronization and OOPS

Fork—join variants for dynamic processes, Built-in mailbox classes, Built-in semaphore classes, Enhanced event data types, Test bench using mailbox, semaphores and event. System Verilog's class data type, defining class objects, Class methods, Class inheritance, Aggregate class, Abstraction class, Polymorphism, Virtual methods, Virtual classes, Public and private classes, Extending class definitions (inheritance), Virtual methods, Virtual classes, Public and private classes.

UNIT-V

System Verilog Constrained Random Value Generation, Functional Coverage and Assertions

Built-in System Verilog random classes, defining constrained random values, constrained random verification methodologies, system Verilog code coverage and functional coverage, Defining and constructing cover groups, Defining cover points and coverage bins, Coverage sampling, Cross coverage. Assertion concepts, Immediate and concurrent assertions, Assertion sequence definitions Testbench using constrained randomization, coverage. and Assertions

Text Books: 1."SystemVerilog for Design: A Guide to Using SystemVerilog for Hardware Design and Modeling" by Sutherland, Davidmann, and Flake.
2. "SystemVerilog Assertions and Functional Coverage: Guide to Language, Methodology and Applications" by Bergeron, Cerny, Hunter, and Nightingale

Reference Books:

1. "SystemVerilog Assertions Handbook: 2nd Edition" by Ben Cohen, Srinivasan Venkataramanan, and Ajeetha Kumari.
2. "SystemVerilog for Verification: A Guide to Learning the Testbench Language Features" by Chris Spear.
3. "A Practical Guide to Adopting the Universal Verification Methodology (UVM)" by Matt Rahl and Kathleen Meade.
4. "SystemVerilog Assertions Handbook: 4th Edition" by Ben Cohen, Srinivasan Venkataramanan, and Ajeetha Kumari.
5.SystemVerilog Unleashed" by Edmond Leung.
6. "SystemVerilog for Verification: A Guide to Learning the Testbench Language Features" by Chris Spear and Greg Tumbush.
7. "SystemVerilog for Verification: A Guide to Learning the Testbench Language Features" by Chris Spear, Greg Tumbush, and Cliff Cummings.

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ANNEXURE - XX

INTERNET OF THINGS AND ITS APPLICATIONS
I Year M. Tech. II semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art Internet of things
CO2:	Identify the architecture and infrastructure of IoT.
CO3:	Choose the appropriate technologies, algorithms, and approaches for the related issues.
CO4:	Identify problems, and explain, analyze, and evaluate various IoT solutions
CO5:	Explain the core issues of IoT such as security, privacy, and interoperability

UNIT-I

THE IoT NETWORKING CORE

History of IoT, Review of Technologies involved in IoT Development, Internet/Web and Networking Basics -OSI Model, Data transfer referred with OSI Model, IP Addressing, Point to Point Data transfer, Point to Multi Point Data transfer & Network Topologies, Sub-netting, Network Topologies referred with Web, Introduction to Web Servers, Introduction to Cloud Computing. Basics of Big Data, Data Science.

UNIT-II

IoT Architecture:

M2M – Machine to Machine, Web of Things, IoT protocols, Introduction to wireless and mobile networks, ZigBee, BLE mesh, WiFi, MQTT, LoRa-Machine Applications: Remote Monitoring & Sensing, Remote Controlling, Performance Analysis.

The Architecture

The Layering concepts , IoT Communication Pattern, IoT protocol Architecture, The 6LoWPAN

Security aspects in IoT

UNIT-III

IoT Platform overview

Overview of IoT supported Hardware platforms such as: Raspberry pi, ARM Cortex Processors, Arduino and Intel Galileo boards.

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Overview and working principle of Wired Networking equipment's – Router, Switches, Overview and working principle of Wireless Networking equipment's – Access Points, Hubs etc. Linux Network configuration Concepts: Networking configurations in Linux Accessing Hardware & Device Files interactions.

UNIT-IV

IoT Application Development:

Application Protocols

MQTT, REST/HTTP, CoAP, MySQL

Back-end Application Designing

Apache for handling HTTP Requests, PHP & MySQL for data processing, MongoDB Object type Database, HTML, CSS & jQuery for UI Designing, JSON lib for data processing, Security & Privacy during development, Application Development for mobile Platforms: Overview of Android / IOS App Development tools.

UNIT-V

CASE STUDIES/INDUSTRIAL APPLICATIONS

IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipment's. Use of Big Data and Visualization in IoT, Industry 4.0 concepts.

Text Books:

1. Jean-Philippe Vasseur, Adam Dunkels, "Interconnecting Smart Objects with IP: The Next Internet", Morgan Kuffmann-2010
2. Vijay Madisetti , ArshdeepBahga, : Internet of Things (A Hands-on-Approach)" -2014
3. Adrian McEwen (Author), Hakim Cassimally, "Designing the Internet of Things" ,Wiley - 2013
4. Dr. OvidiuVermesan, Dr. Peter Friess, "Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems," River Publishers -2013

Reference Books:

1. Barrie Sosinsky, "Cloud Computing Bible", Wiley-India, 2010
2. Asoke K Talukder and Roopa R Yavagal, "Mobile Computing," Tata McGraw Hill, 2010.
3. Adelstein and S.K.S. Gupta, "Fundamentals of Mobile and Pervasive Computing," McGraw Hill, 2009
4. Ronald L. Krutz, Russell Dean Vines "Cloud Security: A Comprehensive Guide to Secure Cloud Computing", Wiley-India, 2010

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ANNEXURE - XXI

Elective III
LOW POWER VLSI DESIGN
I Year M. Tech. II semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
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Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Illustrate the necessity of low power VLSI, Sources of power dissipation techniques and importance of Short-Channel effects
CO2:	Explain the concepts of Low-Power Design Approaches
CO3:	Analyze Low-Voltage Low-Power Adder Circuits
CO4:	Apply Low Power Design concept to Different Multiplier circuits
CO5:	Classify and Compare Low-Voltage Low-Power Memories

UNIT-I

Fundamentals of Low Power VLSI Design

Need for Low Power Circuit Design, Sources of Power Dissipation – Switching Power Dissipation, Short Circuit Power Dissipation, Leakage Power Dissipation, Glitching Power Dissipation, Short Channel Effects –Drain Induced Barrier Lowering and Punch Through, Surface Scattering, Velocity Saturation, Impact Ionization, Hot Electron Effect.

UNIT-II

Low-Power Design Approaches

Low-Power Design through Voltage Scaling – VTCMOS circuits, MTCMOS circuits, Architectural Level Approach –Pipelining and Parallel Processing Approaches.

Switched Capacitance Minimization Approaches

System Level Measures, Circuit Level Measures, Mask level Measures.

UNIT-III

Low-Voltage Low-Power Adders

Introduction, Standard Adder Cells, CMOS Adder's Architectures – Ripple Carry Adders, Carry Look-Ahead Adders, Carry Select Adders, Carry Save Adders, Low-Voltage Low-Power Design Techniques –Trends of Technology and Power Supply Voltage, Low-Voltage Low-Power Logic Styles.

UNIT-IV

Low-Voltage Low-Power Multipliers

Introduction, Overview of Multiplication, Types of Multiplier Architectures, Braun Multiplier, Baugh-Wooley Multiplier, Booth Multiplier, Introduction to Wallace Tree Multiplier.

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UNIT-V
Low-Voltage Low-Power Memories Basics of ROM, Low-Power ROM Technology, Future Trend and Development of ROMs, Basics of SRAM, Memory Cell, Precharge and Equalization Circuit, Low-Power SRAM Technologies, Basics of DRAM, Self-Refresh Circuit, Future Trend and Development of DRAM.

Text Books:
1. CMOS Digital Integrated Circuits – Analysis and Design – Sung-Mo Kang, Yusuf Leblebici, TMH, 2011. 2. Low-Voltage, Low-Power VLSI Subsystems – Kiat-Seng Yeo, Kaushik Roy, TMH Professional Engineering.
Reference Books:
1. Low Power CMOS Design – Anantha Chandrakasan, IEEE Press/Wiley International, 1998. 2. Low Power CMOS VLSI Circuit Design – Kaushik Roy, Sharat C. Prasad, John Wiley & Sons, 2000. 3. Practical Low Power Digital VLSI Design – Gary K. Yeap, Kluwer Academic Press, 2002. 4. Low Power CMOS VLSI Circuit Design – A. Bellamour, M. I. Elamasri, Kluwer Academic Press, 1995.

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ANNEXURE - XXII

Elective III
SYSTEM ON CHIP DESIGN
I Year M. Tech. II semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
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Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Illustrate System on Chip design architecture, Memory and Addressing
CO2:	Compare different processor architectures like VLIW and Superscalar
CO3:	Build SOC Memory system design, Types of cache and Memory interaction
CO4:	Analyze interconnect architectures and Reconfiguration technologies
CO5:	Examine different SOC design application case studies

UNIT-I

Introduction to the System Approach

System Architecture, Components of the system, Hardware & Software, Processor Architectures, Memory and Addressing. System level interconnection, An approach for SOC Design, System Architecture and Complexity.

UNIT-II

Processors

Introduction, Processor Selection for SOC, Basic concepts in Processor Architecture, Basic concepts in Processor Micro Architecture, Basic elements in Instruction handling. Buffers: minimizing Pipeline Delays, Branches, More Robust Processors, Vector Processors and Vector Instructions extensions, VLIW Processors, Superscalar Processors.

UNIT-III

Memory Design for SOC

Overview of SOC external memory, Internal Memory, Size, Scratchpads and Cache memory, Cache Organization, Cache data, Write Policies, Strategies for line replacement at miss time, Types of Cache, Split – I, and D – Caches, Multilevel Caches, Virtual to real translation, SOC Memory System, Models of Simple Processor – memory interaction.

UNIT-IV

Interconnect Customization and Configuration

Inter Connect Architectures, Bus: Basic Architectures, SOC Standard Buses, Analytic Bus Models, Using the Bus model, Effects of Bus transactions and contention time. SOC Customization: An overview, Customizing Instruction Processor, Reconfiguration Technologies, Mapping design onto Reconfigurable devices, Instance- Specific design, Customizable Soft Processor, Reconfiguration - overhead analysis and trade-off analysis on reconfigurable Parallelism.

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UNIT-V
Application Studies / Case Studies SOC Design approach, AES algorithms, Design and evaluation, Image compression – JPEG compression.

Text Books:
1. Computer System Design System-on-Chip - Michael J. Flynn and Wayne Luk, Wiely India Pvt. Ltd. 2. ARM System on Chip Architecture – Steve Furber –2nd Ed., 2000, Addison Wesley Professional.
Reference Books:
1. Design of System on a Chip: Devices and Components – Ricardo Reis, 1st Ed., 2004, Springer 2. Co-Verification of Hardware and Software for ARM System on Chip Design (Embedded Technology) – Jason Andrews – Newnes, BK and CDROM. 3. System on Chip Verification – Methodologies and Techniques –Prakash Rashinkar, Peter Paterson and Leena Singh L, 2001, Kluwer Academic Publishers.

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ANNEXURE - XXIII

Elective III
DIGITAL SIGNAL AND IMAGE PROCESSING
I Year M. Tech. II semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
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Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Analyze discrete-time signals and systems in various domains (i.e Time, Z and Fourier)
CO2:	Design the digital filters (both IIR and FIR) from the given specifications
CO3:	Analyze the quantization effects in digital filters and understand the basics of image sampling, quantization and image transforms.
CO4:	Understand the concepts of image enhancement, image restoration and image segmentation.
CO5:	Know the various methods involved in image compression and fundamentals in color image processing.

UNIT-I

Review of Discrete Time signals and systems, Characterization in time, Z and Fourier domain, Fast Fourier Transform using Decimation In Time (DIT) and Decimation In Frequency (DIF) Algorithms.

UNIT-II

IIR Digital Filters: Introduction, Analog filter approximations – Butter worth and Chebyshev, Design of IIR Digital filters from analog filters using Impulse Invariance, Bilinear Transformation methods.

FIR Digital Filters: Introduction, Design of FIR Digital Filters using Window Techniques, Frequency Sampling technique, Comparison of IIR & FIR filters.

UNIT-III

Analysis Of Finite Word length Effects: The Quantization Process and Errors, Quantization of Fixed-Point Numbers, Quantization of Floating-Point Numbers, Analysis of Coefficient Quantization effects.

Introduction To Digital Image Processing: Introduction, components in image processing system, Applications of Digital image processing, Image sensing and acquisition, Image sampling, Quantization, Basic Relationships between pixels, Image Transforms: 2D-DFT, DCT, Haar Transform.

UNIT-IV

Image Enhancement: Intensity transformation functions, histogram processing, fundamentals of spatial filtering, smoothing spatial filters, sharpening spatial filters, the basics of filtering in

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the frequency domain, image smoothing using frequency domain filters, Image Sharpening using frequency domain filters, Selective filtering.
Image Restoration: Introduction, restoration in the presence of noise only-Spatial Filtering, Periodic Noise Reduction by frequency domain filtering, Linear, Position –Invariant Degradations, Estimating the degradation function, Inverse filtering, Minimum mean square error (Wiener) filtering.
Image Segmentation: Fundamentals, point, line, edge detection, thresholding, region based segmentation.

UNIT-V

Image Compression: Fundamentals, Basic compression methods: Huffman coding, Arithmetic coding, Run-Length coding, Block Transform coding, Predictive coding, Wavelet coding.
Color Image Processing: color fundamentals, color models, pseudo color image processing, basics of full color image processing, color transformations, smoothing and sharpening. Image segmentation based on color, noise in color images, color image compression.

Text Books:

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G.Manolakis, Pearson Education/PHI,2007.
2. S. K. Mitra. "Digital Signal Processing – A Computer based Approach", TMH, 3rd Edition,2006 3. Rafael C.Gonzalez and Richard E. Woods, "Digital Image Processing", Pearson Education, 2011.
4. S.Jayaraman, S.Esakkirajan, T.Veerakumar, "Digital Image Processing", Mc Graw Hill Publishers, 2009

Reference Books:

1. Digital Signal Processing: Andreas Antoniou, TATA McGraw Hill , 2006
2. Digital Signal Processing: MH Hayes, Schaum's Outlines, TATA Mc-Graw Hill, 2007.
3. Anil K. Jain, "Fundamentals of Digital Image Processing," Prentice Hall of India, 2012.

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ANNEXURE - XXIV

Elective IV
COMMUNICATION BUSES AND INTERFACES
I Year M. Tech. II semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Compare serial buses like RS232, RS485, I2C, and SPI in terms of data rates, features, limitations, and applications.
CO2:	Understand CAN architecture, including ISO 11898 standards, data transmission, frame formats, and application layers.
CO3:	Outline PCIe revisions, configuration space, bus enumeration, hardware/software implementation, protocols, and applications.
CO4:	Understand USB transfer types, enumeration states, descriptor types, and device drivers.
CO5:	Learn about SFPDP configurations, flow control, and serial data transmission over fiber and copper cables.

UNIT-I
Serial Busses- Cables, Serial busses, serial versus parallel, Data and Control Signal- data frame, data rate, features Limitations and applications of RS232, RS485, I2C, SPI

UNIT-II
CAN **ARCHITECTURE**- ISO 11898-2, ISO 11898-3, Data Transmission- ID allocation, Bit timing, Layers- Application layers, Object layer, Transfer layer, Physical layer, Frame formats- Data frame, Remote frame, Error frame, Over load frame, Ack slot, Inter frame spacing, Bit spacing, Applications.

UNIT-III
PCIe Revision, Configuration space- configuration mechanism, Standardized registers, Bus enumeration, Hardware and Software implementation, Hardware protocols, Applications.

UNIT-IV
USB Transfer Types- Control transfers, Bulk transfer, Interrupt transfer, Isochronous transfer. Enumeration- Device detection, Default state, addressed state, Configured state, enumeration sequencing. Descriptor types and contents- Device descriptor, configuration descriptor, Interface descriptor, Endpoint descriptor, String descriptor. Device driver.

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UNIT-V
Data streaming Serial Communication Protocol- Serial Front Panel Data Port (SFPDP) configurations, Flow control, serial FPDP transmission frames, fiber frames and copper cable.

Text Books:
1. A Comprehensive Guide to controller Area Network – Wilfried Voss, Copperhill Media Corporation, 2nd Ed., 2005. 2. Serial Port Complete-COM Ports, USB Virtual Com Ports and Ports for Embedded Systems- Jan Axelson, Lakeview Research, 2nd Ed.,
Reference Books:
1. USB Complete – Jan Axelson, Penram Publications. 2. PCI Express Technology – Mike Jackson, Ravi Budruk, Mindshare Press.

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ANNEXURE - XXV

Elective IV
DESIGN FOR TESTABILITY
I Year M. Tech. II semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Outline the testing process and fault modelling
CO2:	Analyze different algorithms for true value and fault simulation
CO3:	Test circuits for SCOAP measures and list various scan design methods
CO4:	Analyze BIST process and types of BISTs
CO5:	Analyze fault coverage using ATPG techniques

UNIT-I

Introduction to Testing
Testing Philosophy, Role of Testing, Digital and Analog VLSI Testing, VLSI Technology Trends affecting Testing, Types of Testing, Fault Modeling: Defects, Errors and Faults, Functional Versus Structural Testing, Levels of Fault Models, Single Stuck-at Fault.

UNIT-II

Logic and Fault Simulation
Simulation for Design Verification and Test Evaluation, Modeling Circuits for Simulation, Algorithms for True-value Simulation, Algorithms for Fault Simulation.

UNIT-III

Testability Measures
SCOAP Controllability and Observability, High Level Testability Measures, Digital DFT and Scan Design: Ad-Hoc DFT Methods, Scan Design, Partial-Scan Design, Variations of Scan.

UNIT-IV

Built-In Self-Test
The Economic Case for BIST, Random Logic BIST: Definitions, BIST Process, Pattern Generation, Response Compaction, Built-In Logic Block Observers, Test-Per-Clock, Test-Per-Scan BIST Systems, Circular Self Test Path System, Memory BIST, Delay Fault BIST.

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UNIT-V
ATPG Single stuck at fault, Fault collapsing, ATPG Algorithm and Tetra-max tool flow,Fault models,Single stuck at operation,Delay fault model,Bridge Fault models,ATPG models, Fault classes,ATPG effectiveness,ATPG modes,Coverge and improvement techniques

Text Books:
1. Essentials of Electronic Testing for Digital, Memory and Mixed Signal VLSI Circuits - M.L. Bushnell, V. D. Agrawal, Kluwer Academic Publishers.
Reference Books:
1. Digital Systems and Testable Design - M. Abramovici, M.A.Breuer and A.D Friedman, Jaico Publishing House. 2. Digital Circuits Testing and Testability - P.K. Lala, Academic Press.

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ANNEXURE - XXVI

Elective IV
DSP PROCESSORS AND ARCHITECTURES
I Year M. Tech. II semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Understand DSP fundamentals and analyze computational accuracy and error sources in DSP implementations.
CO2:	Outline the basic architecture, computational blocks, memory, and external interfacing features of programmable DSP devices.
CO3:	Learn about the TMS320C54XX DSP's architecture, memory, instructions, peripherals, interrupts, and pipeline operation.
CO4:	Examine the Analog Devices DSP family, including ALU/MAC blocks, ADSP 2100, ADSP-2181, and Blackfin processor architecture.
CO5:	Analyze memory space organization, external bus interfacing, I/O methods, and DMA in programmable DSP devices.

UNIT-I

Introduction to Digital Signal Processing

Introduction, a Digital signal-processing system, the sampling process, discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time-invariant systems, Digital filters, Decimation and interpolation.

Computational Accuracy in DSP Implementations

Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT-II

Architectures for Programmable DSP Devices

Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation UNIT, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT-III

Programmable Digital Signal Processors

Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX Instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX Processors, Pipeline Operation of TMS320C54XX Processors.

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UNIT-IV
Analog Devices Family of DSP Devices Analog Devices Family of DSP Devices – ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP 2100, ADSP-2181 high performance Processor. Introduction to Black fin Processor - The Black fin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files, Address Arithmetic Unit, Control Unit, Bus Architecture and Memory, Basic Peripherals.

UNIT-V
Interfacing Memory and I/O Peripherals to Programmable DSP Devices Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA).

Text Books:
1. Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications, 2004. 2. A Practical Approach To Digital Signal Processing - K Padmanabhan, R. Vijaya rajeswaran, Ananthi. S, New Age International, 2006/2009 3. Embedded Signal Processing with the Micro Signal Architecture: Woon-Seng Gan, Sen M. Kuo, Wiley-IEEE Press, 2007
Reference Books:
1. Digital Signal Processors, Architecture, Programming and Applications-B. Venkataramani and M. Bhaskar, 2002, TMH. 2. DSP Processor Fundamentals, Architectures & Features – Lapsley et al. 2000, S. Chand & Co. 3. Digital Signal Processing Applications Using the ADSP-2100 Family by The Applications Engineering Staff of Analog Devices, DSP Division, Edited by Amy Mar, PHI 4. The Scientist and Engineer's Guide to Digital Signal Processing by Steven W. Smith, Ph.D., California Technical Publishing, ISBN 0-9660176-3-3, 1997.

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ANNEXURE - XXVII

RTL DESIGN & VERIFICATION USING SYSTEM VERILOG LAB

I Year M. Tech. II semester

(Branch: VLSI Design & Embedded Systems)

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Implementation of FSMs using System Verilog
CO2:	Transform Verilog RTL code to System verilog
CO3:	Design and Verify combinational digital applications using System Verilog
CO4:	Develop FIFO using conditional constructs
CO5:	Analyze the functional coverage for digital applications

List of Experiments:

1) Perform the following functions using System verilog
   a) Test all the 2-state and 4-state Data types.
   b) Design a 1010, 1011, 1110, and 1111 overlapped finite sequence, use enumerated data type, user defined data type and verify using system Verilog test-bench
   c) Declare structure and union, assign different values to the elements of structure and union, access the variables of the elements of the structure and unions using test-bench.
   d) Declare different arrays, assign values and test different access methods using test-bench.
   e) Declare a queue, assign values and test different access methods using test-bench.
2) Transform a Verilog RTL code to System Verilog code using packages, user defined data types, interface, mod port, clocking blocks.
3) Declare a program block and final block in a test-bench.
4) Design and verify the fixed priority arbiters using the following
   i) If – else
   ii) Case
   iii) Priority If
   iv) Priority Case

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5) Design and verify generic decoder using the following
   i) If – else
   ii) Case
   iii) Priority If
   iv) Priority Case
6) Design a Fibonacci series using loops and verify the same using test bench
7) Implementation of Priority based scheduler using System Verilog
8) Develop System-on-Chip (SoC) architecture
9) Develop a FIFO using the object-oriented programming
   i. Usage of Encapsulation and inheritance.
   ii. Modify the above developed test-bench using polymorphism.
10) Pick a scenario for each assertion type and execute.
   a. Modify the above test-bench to increase the functional coverage by using constrained random generation.
   b. Modify the above test-bench by writing specific assertions to enhance coverage further

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ANNEXURE - XXVIII

INTERNET OF THINGS AND ITS APPLICATIONS LAB
I Year M. Tech. II semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Understand Arduino, Node MCU, Raspberry Pi, and cloud services like Thingspeak and Blynk.
CO2:	Interface with ESP8266/Raspberry Pi to control LED blinking, switching, and intensity using PWM.
CO3:	Transmit LED and ultrasonic sensor data to cloud services via ESP8266/Raspberry Pi.
CO4:	Develop IoT projects such as temperature/humidity loggers and automatic plant watering systems.
CO5:	Create remote control systems for street lights and motion detectors with email notifications.

List of Experiments

1. Introduction to Arduino, Node MCU, Raspberry Pi and Cloud Service (Thingspeak, Blynk, …)
2. Blinking an LED by interfacing with ESP8266 / Raspberry Pi
3. Controlling an LED with a switch by interfacing with ESP8266 / Raspberry Pi
4. Change intensity of an LED using PWM by interfacing with ESP8266 / Raspberry Pi
5. Send LED status to a Cloud Service by interfacing with ESP8266 / Raspberry Pi
6. Send Ultrasonic Sensor Status to a Cloud Service by interfacing with ESP8266 / Raspberry Pi
7. IoT based Motor control by interfacing with ESP8266 / Raspberry Pi

Mini Projects

1. IoT based Temperature and Humidity logger using any Cloud Service
2. Remote Monitoring and Automatic Control of Street Lights
3. IoT based Automatic Plant Watering System
4. IoT based Motion detector with email Notification

Additional Experiments

1. Publishing sensor data to Google Spreadsheets
2. Photo capture and video streaming using Raspberry Pi

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ANNEXURE - XXIX

MINI PROJECT WITH SEMINAR
I Year M. Tech. II semester
(Branch: VLSI Design & Embedded Systems)

L	T	P	C
0	0	4	2

Course Outcomes: At the end of the Course, the student shall be able to	
CO1:	Learn new concepts and apply them to the solution of engineering problems
CO2:	Demonstrate the skills for performing literature survey, identify gaps, analyze the technical content
CO3:	Formulate and conduct experiments and utilize modern tools for developing working models / process / system
CO4:	Clearly communicate their ideas in writing and prepare a well-documented report
CO5:	Create informative PPTs and clearly communicate their ideas orally demonstrating technical knowledge

Syllabus Contents

The students are required to search / gather the material / information on a specific a topic comprehend it and present / discuss in the class.

Evaluation of Mini Project

- For Mini Project with Seminar, a student under the supervision of a faculty member, shall collect the literature on a topic and critically review the literature and submit it to the department in a report form.
- The student shall make an oral presentation before the Project Review Committee consisting of Head of the Department, supervisor/mentor and two other senior faculty members of the department.
- For Mini Project with Seminar, there will be only internal evaluation of 100 marks. A candidate has to secure a minimum of 50% of marks to be declared successful.

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Annexure-13

Research Methodology & IPR

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 2**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

Unit 1: Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations.

Unit 2: Effective literature studies approaches, analysis Plagiarism, Research ethics

Unit 3: Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

Unit 4: Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

Unit 5: Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

Unit 6: New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.

Reference Books:

1. Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science& engineering students'"
2. Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"
3. Ranjit Kumar, 2 ndEdition, "Research Methodology: A Step by Step Guide for beginners"
4. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd,2007.
5. Mayall, "Industrial Design", McGraw Hill, 1992.
6. Niebel, "Product Design", McGraw Hill, 1974.
7. Asimov, "Introduction to Design", Prentice Hall, 1962.
8. Robert P. Merges, Peter S. Menell, Mark A. Lemley, "Intellectual Property in New Technological Age", 2016.
9. T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008

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Organizational Behavior (Audit Course)

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 0**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Organizational Behavior: Concept of Organization - Concept of Organizational Behavior - Nature of Organizational Behavior - Role of Organizational behavior - Disciplines contributing to Organizational Behavior.

UNIT II: Motivation: Definition - Nature of Motivation - Role of Motivation - Theories of Motivation: Maslow's Need Hierarchy Theory, Herzberg's Motivation Hygiene Theory and McGregor's Theory X and Theory Y.

UNIT III: Group Dynamics: Meaning - Concept of Group - Types of groups -Formal and Informal groups - Group development - Group cohesiveness and factors affecting group cohesiveness

UNIT IV: Leadership: Concept of Leadership - Difference between Leadership and Management - Importance of Leadership - Leadership styles: Autocratic leadership, Participative leadership and Free Rein leadership.

UNIT V: Communication: Meaning - Communication Process - Forms of communication: Oral, Written and Non- Verbal communication - Direction of communication: Downward, Upward and Horizontal communication.

UNIT VI: Organizational conflicts: Concept of conflict - Reasons for conflict - Types of Conflict:Intrapersonal conflict, Interpersonal conflict, Intragroup conflict, Intergroup conflict, Inter organizational conflict - Conflict management.

UNIT VII: Organizational Change: Nature - Factors in Organizational change -Planned change: Process of planned change - Resistance to change: Factors in resistance to change – Overcoming resistance to change.

Text Books:

1. L.M.Prasad: Organizational Behavior, Sultan Chand & Sons, New Delhi -110002.

Reference Books:

1. K. Aswathappa: Organizational Behavior, Himalaya Publishing House, New Delhi.
2. Stephen Robbins: Organizational Behavior, Pearsons Education, New Delhi.

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ENTREPRENEURSHIP (AUDIT COURSE)

M. Tech-Computer Science and Engineering (Data Science)

Instruction: 3 Periods/week	**Time: 3 Hours**	**Credits: 0**
Internal: 30 Marks	**External: 70 Marks**	**Total: 100 Marks**

UNIT I: Basic Concepts of Management: Definition, Nature and Importance ; Functions of the Management; Levels of Management; F.W Taylor's Scientific Management; Henry Fayol's Principles of Management.

UNIT II: Forms of Business Organizations: Introduction, Types of Business organizations: Private Sector- Individual Ownership , Partnership, Joint stock companies and Co-Operative organizations; Public sector- Departmental Organizations, Public Corporations and Government Companies; The Joint sector Management

UNIT III: Production and operations Management: Plant location- Factors to be considered in the selection of Plant location; Break - even analysis- Significance and managerial applications; Importance of Production Planning and Control and its Functions; Human Resource Management and Functions of Human Resource Manager (in brief); Functions of Marketing; Methods of Raising Finance

UNIT IV: Entrepreneurship: Definition, Characteristics and Skills , Types of Entrepreneurs, Entrepreneur vs. Professional Managers, , Growth of Entrepreneurs, Nature and Importance of Entrepreneurs, Women Entrepreneurs, Problems of Entrepreneurship.

UNIT V: Entrepreneurial Development and Project Management: Institutions in aid of Entrepreneurship Development, Idea generation: Sources and Techniques;, Stages in Project formulation ; Steps for starting a small enterprise - Incentives for Small Scale Industries by Government

Text Books:

1. Sharma,S.C, and Banga, T.R., Industrial Organization & Engineering Economics, Khanna Publishers, Delhi, 2000.

Reference Books:

1. VasantDesai ,The Dynamics of Entrepreneurial Development and Management (Planning for future Sustainable growth),HImalayan Publishing House, 2018
2. Aryasri , A.R., Management Science, McGraw HIll Education (India Private Limited , New Delhi 2014.
3. Sheela, P. , and JagadeswaraRao, K., Entrepreneurship, Shree Publishing House, Guntur

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Detailed Syllabus for M.Tech – VLSI Design & Embedded Systems - First Semester

RESEARCH METHODOLOGY AND IPR

Instruction: 3Periods/week	**Time: 3 Hours**	**Credits: 2**
Internal: 30Marks	**External: 70 Marks**	**Total: 100Marks**

Unit 1: Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

Unit 2: Effective literature studies approaches, analysis Plagiarism, Research ethics,

Unit 3: Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

Unit 4: Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

Unit 5: Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

Unit 6: New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.

References:

1. Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science& engineering students"
2. Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"
3. Ranjit Kumar, 2 ndEdition, "Research Methodology: A Step by Step Guide for beginners"
4. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd,2007.
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6. Niebel, "Product Design", McGraw Hill, 1974.
7. Asimov, "Introduction to Design", Prentice Hall, 1962.
8. Robert P. Merges, Peter S. Menell, Mark A. Lemley, "Intellectual Property in New Technological Age", 2016.
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Audit Course
Organizational Behavior

M. Tech- VLSI Design and Embedded Systems

I -Semester	**Subject Code:**	**Instruction: 3 Periods/week**
Credits: 3	**Internal: 100 Marks**	**Total: 100 Marks**

Unit 1: Organizational Behavior

Concept of Organization - Concept of Organizational Behavior - Nature of Organizational Behavior - Role of Organizational behavior - Disciplines contributing to Organizational Behavior.

Unit 2: Motivation

Definition - Nature of Motivation - Role of Motivation - Theories of Motivation: Maslow's Need Hierarchy Theory, Herzberg's Motivation Hygiene Theory and McGregor's Theory X and Theory Y.

Unit 3: Group Dynamics

Meaning - Concept of Group - Types of groups -Formal and Informal groups - Group development - Group cohesiveness and factors affecting group cohesiveness

Unit 4: Leadership

Concept of Leadership - Difference between Leadership and Management - Importance of Leadership - Leadership styles: Autocratic leadership, Participative leadership and Free Rein leadership.

Unit 5: Communication

Meaning - Communication Process - Forms of communication: Oral, Written and Non- Verbal communication - Direction of communication: Downward, Upward and Horizontal communication.

Unit 6: Organizational conflicts

Concept of conflict - Reasons for conflict - Types of Conflict: Intrapersonal conflict, Interpersonal conflict, Intragroup conflict, Intergroup conflict, Inter organizational conflict - Conflict management.

Unit 7: Organizational Change

Nature - Factors in Organizational change -Planned change: Process of planned change - Resistance to change: Factors in resistance to change – Overcoming resistance to change.

Text Books:

1. L.M.Prasad: Organizational Behavior, Sultan Chand & Sons, New Delhi -110002.

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1. K. Aswathappa: Organizational Behavior, Himalaya Publishing House, New Delhi.
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Audit Course

ENTREPRENEURSHIP

M. Tech-VLSI Design and Embedded Systems

II- Semester	**Subject Code:**	**Instruction: 3 Periods/week**
Credits: 3	**Internal: 100 Marks**	**Total: 100 Marks**

Unit 1: Basic Concepts of Management: Definition, Nature and Importance; Functions of the Management; Levels of Management; F.W Taylor's Scientific Management; Henry Fayol's Principles of Management.

Unit 2: Forms of Business Organizations: Introduction, Types of Business organizations: Private Sector-Individual Ownership, Partnership, Joint stock companies and Co-Operative organizations; Public sector-Departmental Organizations, Public Corporations and Government Companies; The Joint sector Management

Unit 3: Production and operations Management: Plant location- Factors to be considered in the selection of Plant location; Break - even analysis- Significance and managerial applications; Importance of Production Planning and Control and its Functions; Human Resource Management and Functions of Human Resource Manager (in brief); Functions of Marketing; Methods of Raising Finance

Unit 4: Entrepreneurship: Definition, Characteristics and Skills , Types of Entrepreneurs, Entrepreneur vs. Professional Managers, , Growth of Entrepreneurs, Nature and Importance of Entrepreneurs, Women Entrepreneurs, Problems of Entrepreneurship.

Unit 5: Entrepreneurial Development and Project Management: Institutions in aid of Entrepreneurship Development, Idea generation: Sources and Techniques;, Stages in Project formulation ; Steps for starting a small enterprise - Incentives for Small Scale Industries by Government

Text Books:

1. Sharma,S.C, and Banga, T.R., Industrial Organization & Engineering Economics, Khanna Publishers, Delhi, 2000.

Reference Books:

1. Vasant Desai ,The Dynamics of Entrepreneurial Development and Management (Planning for future Sustainable growth),H Imalayan Publishing House, 2018
2. Aryasri , A.R., Management Science, McGraw Hill Education (India Private Limited , New Delhi 2014.
3. Sheela, P. , and Jagadeswara Rao, K., Entrepreneurship, Shree Publishing House, Guntur

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ANNEXURE - II

ACADEMIC RULES AND REGULATIONS (R-24)

FOR B.TECH. PROGRAMMES INCLUDING HONORS AND MINORS

[Under Choice Based Credit System in line with NEP 2020]

[Effective from 2024-25 admitted batch]

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN

(AUTONOMOUS)

MADHURAWADA, VISAKHAPATNAM 530048

AFFILIATED TO ANDHRA UNIVERSITY, VISAKHAPATNAM

ACADEMIC REGULATIONS

FOR B.TECH. PROGRAMMES INCLUDING HONORS AND MINORS

(Under Choice Based Credit System effective from 2024-25 admitted batch)

These Regulations shall be called the **"GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN (AUTONOMOUS) - REGULATIONS 2024 (R-24) FOR THE AWARD OF B.TECH. DEGREE".** These regulations shall be applicable for students enrolling for B.Tech. degree programmes at the Institute from Academic Year 2024-25.
The admission of students shall be as per Govt. of Andhra Pradesh rules.
The medium of instruction for course work and examinations at the Institute shall be English.

1. **Award of the Degree/ Degree with Minor specialization/ Degree with Honors Specialization:**

(a) Award of the B.Tech. Degree / B.Tech. Degree with a Minor if she fulfils the following:

(i) Pursues a course of study for not less than four academic years and not more than eight academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would in addition to the maximum period permitted for graduation (Eight years).

(ii) Registers for 160 credits and secures all 160 credits.

(b) Award of B.Tech. degree with Honors if she fulfils the following:

(i) Student secures an additional 15 credits fulfilling all the requisites of a B.Tech. program i.e., 160 credits.

(ii) Honors is to be completed simultaneously with B.Tech. programme.

2. **Structure of the B.Tech. program:**

S. No.	Category	Code	Credits breakup
1	Humanities and Social science including Management courses	HSMC	10.5
2	Basic Science courses	BSC	16 -18*
3	Engineering Science courses	ESC	22 – 27*
4	Professional Core Courses	PCC	51 – 54*
5	Open Elective Courses	OEC	12
6	Professional Elective courses	PEC	15
7	Project work, Internship, Seminar	PROJ	18
8	Mandatory courses (Non-credit)	MC	-
9	Skill oriented Courses	SoC	10
		Total Credits	**160**

*The actual value is based on the Department's breakup for the courses.

The credits are allotted as:
1 Hr. Lecture (L) per week - 1 credit
1 Hr. Tutorial (T) per week - 1 credit
1 Hr. Practical (P) per week - 0.5 credits.

2.1 Semester-wise structure:

<table>
<tr><th>Semester</th><th colspan="2">Composition</th><th>Credits</th></tr>
<tr><td>0</td><td colspan="2">Induction Programme (2-3 weeks)</td><td>0 Credits</td></tr>
<tr><td>I</td><td>5 Theory + 3 Labs
[19.5 Credits]</td><td rowspan="2"></td><td rowspan="2">39 Credits</td></tr>
<tr><td>II</td><td>5 Theory + 3 Labs
[19.5 Credits]</td></tr>
<tr><td>III</td><td>5 Theory + 2/ 3 Labs + 1 skill lab
[20-21.5 Credits]</td><td rowspan="2">Includes
Non-Credit Mandatory Courses
PEUHV& NCC/NSS/Social Activities/ Life skills/ ES</td><td rowspan="2">41.5 Credits</td></tr>
<tr><td>IV</td><td>5 Theory + 2/3 Labs + 1 skill lab
[20-21.5 Credits]</td></tr>
<tr><td colspan="4">Intern-I: 2 Months Community oriented Internship (CSP-Mandatory) during summer vacation</td></tr>
<tr><td>V</td><td>3 Theory + 2/3 Labs + 1 PE+ 1 OE + 1 skill course + Internship-I
[22-23.5 Credits]</td><td rowspan="2">Includes
Non-Credit Mandatory Courses</td><td rowspan="2">43.5 Credits</td></tr>
<tr><td>VI</td><td>3 Theory + 2/3 Labs + 1 PE + 1 OE + 1 skill course
[20-21.5 Credits]</td></tr>
<tr><td colspan="4">Intern-II: 2 Months Industrial/Research Internship (Mandatory) during summer vacation</td></tr>
<tr><td>VII</td><td>3 PE + 2 OE +1 HSSE+1 skill course + Industrial Internship-II
[22 credits]</td><td></td><td>22 Credits</td></tr>
<tr><td>VIII</td><td>Project work / Internship in Industry
[14 credits]</td><td></td><td>14 Credits</td></tr>
<tr><td colspan="3">TOTAL CREDITS FOR REGULAR PROGRAMME</td><td>160 Credits</td></tr>
</table>

Non-credit mandatory courses: Environmental Sciences, Human Values & Professional Ethics, Indian Constitution, Essence of Indian Traditional Knowledge

Students opting for Minors shall complete 4 courses from the prescribed list during IV to VII Semesters by registering for a minimum of one course in each semester and earn 12 credits.

Students opting for Honors shall complete 5 courses from the prescribed list during IV to VII Semesters by registering for a minimum of one course in each semester and earn 15 credits.

3. **Student Induction Programme:** There will be mandatory student induction programme for freshers for two to three weeks before the commencement of first semester. Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations etc.

4. A student shall register for courses in each semester offered by the concerned department under Choice Based Credit System (CBCS). The Open Electives are offered to students of all branches in general. However, a student shall choose an open elective from the list in such a manner that she has not studied the same course during the Programme.

5. All the students shall register for NCC/NSS/Social activities/life skills. A student will be required to participate in an activity for two hours in a week during Third/ Fourth/ Fifth semesters. Grade shall be awarded as Satisfactory or Unsatisfactory in the mark sheet on the basis of participation, attendance, performance and behavior. If a student gets an unsatisfactory Grade, she shall repeat the above activity in the subsequent years, in order to complete the degree requirements.

6. A student shall be permitted to pursue up to a maximum of 20% of total credits (i.e., 32 Credits out of a total 160 credits) from elective courses (from Professional, HSS and Open Electives only) under MOOCs during B.Tech. programme. Every student shall mandatorily complete a minimum one course under MOOCs. Each of the courses must be of a minimum 8 weeks/ 12 weeks in duration. One faculty in-charge is nominated for each course to monitor the registration and progression of the student. Attendance will not be counted for courses under MOOCs. The Head of the department shall notify the list of such courses at the beginning of the semester. The student has to pursue and acquire a certificate for a course under MOOCs (NPTEL/SWAYAM) from the organizations/agencies approved by the BoS in order to earn the 2 credits/ 3 credits within the same semester.

7. The students shall register for professional and open elective courses at the beginning of the semester. There shall be a limit on the minimum and maximum number of registrations based on class / section strength.

8. Students shall undergo mandatory summer internships for a minimum of six weeks duration each at the end of second and third year of the Programme. There shall also be mandatory full internship in the final semester of the Programme. (implementation shall be in line with the guidelines of APSCHE / affiliating University).

9. **Attendance Requirements:**

   i) A student shall be eligible to appear for end semester examinations if she acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester.
   - In the case of students who participate in activities like NSS, NCC, sports, intercollegiate tournaments conducted at National level/State Level/ University Level with prior approval of the Principal, the candidate may be deemed to have attended the college during the actual period of such activity, solely for the purpose of attendance.
   - Participating in the seminar, workshop, conference with prior approval of the Principal, the candidate may be deemed to have attended the college during the actual period of

such activity, solely for the purpose of attendance permission. The maximum period of such events is limited to 10 days.

- In the case of students admitted under special circumstances (late admission / transfer etc.,), the candidate shall attend at least 50% of the total classes held during semester and shall have attended at least 75% of the total classes held from the date of admission of the student.

ii) Condonation for shortage of attendance in aggregate up to 10% (greater than 65% and less than 75%) in each semester may be granted on medical grounds. A stipulated fee shall be payable to the college towards condonation of shortage of attendance.

iii) Students whose shortage of attendance is not condoned in any semester are detained and are not eligible to take their end semester examination of that class and their registration shall stand cancelled.

iv) A student will not be promoted to the next semester unless she satisfies the attendance requirements of the present semester, as applicable. They shall seek readmission and continue her course of study from that semester when offered next.

10. Method of Evaluation:

The performance of a student in each semester shall be evaluated through Continuous Internal Evaluation and End Semester Examination. The student shall earn the credits in the respective courses by obtaining at least the marks as specified in the pass criteria given below:

S. No	Type of Course	Continuous Internal Evaluation	End Semester Examination (3 hours)		Pass Criteria
			Max Marks	Evaluation	
1.	Theory Courses	30 Marks Evaluation process: 20 marks (Two internal tests each for 20 marks.) 10 marks (Four assessments 2 before mid1 and 2 before mid-2 by at least any two of the following methods each for 05 marks. (Assessment Methods: Assignment / Quiz / Term paper / Surprise test / seminar / Open book test / Case study / Projects /Any other Teacher specific method). The final internal score is [4*(best of the two out of 30) +1*(the other mark)]/5	70 Marks	Double Valuation	**40% (28 marks) from End semester and 40% (40 marks) on aggregate from Internal and End semester Examination put together.**

S. No	Type of Course	Continuous Internal Evaluation	End Semester Examination (3 hours)		Pass Criteria
			Max Marks	Evaluation	
2.	Professional Elective/ Open Elective	30 Marks (same as that for Theory course in S. No. 1)	70 Marks	Double Valuation	**40% (28 marks) from End semester and 40% (40 marks) on aggregate from Internal and End semester Examination put together.**
3.	Practical Courses Including CAD/e-CAD and Engg. Workshop	50 Marks 20 marks (15 marks for day-wise performance including observation and viva, 5 marks for record.) 30 marks (from the best of the two internal examinations, each being conducted at the end of a cycle/mid semester).	50 Marks	Single Valuation	**50% (25 marks) from End semester Examination and 50% (50 marks) on aggregate from Internal and End semester Examinations put together.**
4.	Design Thinking & Innovation Courses	50 Marks Design thinking phase-wise performance assessment	50 Marks	Single Valuation	**50% (25 marks) from End semester Examination and 50% (50 marks) on aggregate from Internal and End semester Examinations put together.**
5.	Skill Oriented Courses	50 Marks 20 marks (day-wise performance including observation and viva) 30 marks (from internal examinations at the end of the semester).	50 Marks	Single Valuation (Based on report and viva voce examination conducted by concerned teacher and a senior expert in the subject from the same department)	**50% (25 marks) from End semester Examination and 50% (50 marks) on aggregate from Internal and End semester Examinations put together.**

S. No	Type of Course	Continuous Internal Evaluation	End Semester Examination (3 hours)		Pass Criteria
			Max Marks	Evaluation	
6.	Non-Credit Mandatory courses	-	100 Marks	Single Valuation	**40% (40 Marks) from End Semester Examination. No marks or letter grade shall be allotted for all the non- credit mandatory courses.**
7.	Summer Internships / Community Service Project	-	100 Marks	Single Valuation Through an Internal committee (comprising of HoD, Supervisor and a senior faculty of the department) based on Report (50%), Presentation and Viva-voce (50%).	**50% (50 Marks) from End Semester Examination.**
8.	Project Work	50 Marks 25 marks (Two reviews each for 25 Marks based on the progress, through an Internal committee comprising of HoD, Project Supervisor and a senior faculty of the department. The final score is 1/3rd of the I Review and 2/3rd of the II Review) 25 marks (Given by the guide according to the given rubric	150 Marks	Single Valuation (based on the report, Presentation and Viva-voce examination).	**50% (75 marks) from End semester Examination and 50% (100 marks) on aggregate from Internal and End semester Examinations put together.**

Note 1: If a student misses both the mid examinations in an ongoing semester, then on satisfactory medical grounds, she is permitted to take a re-test before external examination of that semester based on either mid-I or mid-II syllabus and 80% of the marks will only be considered.

11. Valuation of Scripts:

For both single and double valuation, a chief examiner shall be appointed for each theory course to monitor the valuation process and evaluate at least 10% of scripts per bundle at random for which the marks awarded by the chief examiner shall be final.
In case of double valuation, in addition to the above,

i) If the difference between the first and second valuations is less than or equal to 10 marks (15% of 70 marks), the better of the two valuations shall be awarded.

ii) If the difference between the first and second valuations is more than 10 marks (15% of 70 marks), the chief examiner shall value the script. Out of the three valuations, the average of marks obtained in third valuation and the marks obtained nearer to third valuation out of first two valuations shall be considered.

12. Supplementary Examinations:

Supplementary examinations will be conducted only with the corresponding regular examinations.
If a student fails in Design Thinking and Innovation courses/Internship (Industrial or Research or Community Service Project) / Comprehensive Viva/ final semester Project Work, the student shall appear for supplementary examination as and when conducted.

13. Revaluation:

i) Revaluation of any theory subject shall be entertained within a stipulated period on payment of specified fee.

ii) There is no revaluation for any lab subjects/practical subjects/skill-oriented courses.

14. Withholding of Result:

The result of a student in a semester shall be withheld and not declared if the student has disciplinary action pending against her.

15. Promotion Rules:

A student shall fulfill the minimum attendance requirements in every semester for promotion to next semester, as mentioned in point 9.

16. Grading:

The marks obtained in each subject (out of 100 marks) will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student fall.
Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale.
Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P and F.

Grades and Grade Points

Marks Range		Letter Grade		Grade Point
Theory (including Mandatory courses)	Practical, Drawing, Design Thinking, SoCs, Internships, Project			
> 90 to ≤ 100	> 90 to ≤ 100	O	Outstanding	10
> 80 to ≤ 90	> 80 to ≤ 90	A+	Excellent	9
> 70 to ≤ 80	> 70 to ≤ 80	A	Very Good	8
> 60 to ≤ 70	> 60 to ≤ 70	B+	Good	7
> 55 to ≤ 60	> 55 to ≤ 60	B	Above Average	6
≥ 50 to ≤ 55	≥ # 50 to ≤ 55	C	Average	5
≥ *40 to < 50	-	P	Pass	4
< 40	-	F	Fail	0
		Ab	Absent	0

* Pass mark for Theory courses, # Pass mark for all other courses

Calculation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

i) The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.

$$SGPA = \Sigma (C_i \times G_i) / \Sigma C_i$$

where, C_i is the number of credits of the i^{th} subject and G_i is the grade point scored by the student in the i^{th} course

ii) The CGPA will be computed in the same manner as taking into account all the courses undergone by a student over all the semesters of a program, i.e.

$$CGPA = \Sigma (C_i \times S_i) / \Sigma C_i$$

where S_i is the SGPA of the i^{th} semester and C_i is the total number of credits in that semester. CGPA is calculated from II semester onwards up to the final semester, considering all the courses offered from the First semester onwards.

iii) Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts. CGPA is calculated for those who clear all the courses including present semester.

iv) While computing the SGPA/CGPA, the subjects in which the student is awarded Zero grade points will also be included.

v) A candidate has to secure a minimum of 5.0 SGPA for a pass in each semester.

17. Award of Degree:

A. Eligibility for the award of Degree/ Degree with Minor:

A student shall be eligible for the award of the B.Tech. Degree/ B.Tech. Degree with Minor if she fulfills the following conditions:

i) Register and successfully complete all the courses prescribed within the stipulated period.

ii) Earn 160 credits for B.Tech. degree/ earn 12 credits within 160 credits for B.Tech. with Minor degree and pass in all non-credit mandatory courses.
iii) Secure satisfactory grade in social activity.
iv) No disciplinary action is pending against her.
v) Pays the prescribed fee for all the years.

B. Eligibility for the award of degree with Honors:
A student shall be eligible for the award of degree with Honors in a specific specialization if she satisfies conditions i, iii, iv, v cited above (17.A) and earns 15 credits in addition to 160 Credits.

The student eligible for award of B.Tech. degree, shall be placed in one of the following:

Class Awarded	CGPA Secured
First Class with Distinction	**≥ 7.0** (within four years for regular and three years for lateral entry without any supplementary appearance in any semester)
First Class	**≥ 6.0 and < 7.0**
Second Class/ Pass	**≥ 5.0 and < 6.0**

CGPA to Percentage of Marks: Equivalent percentage of marks = **CGPA*10**

18. Gap Year - concept of Student Entrepreneur in Residence:

Outstanding students who wish to pursue entrepreneurship are allowed to take a break of one year at any time after I year / II year / III year to pursue entrepreneurship full time. This period shall be counted for the maximum time for graduation. An evaluation committee at the college level shall be constituted to evaluate the proposal submitted by the student and the committee shall decide on permitting the student for availing the Gap Year.

19. Curricular Framework for Mandatory Internships:

i) Two summer internships each with a minimum of six weeks duration, done at the end of IV and VI semesters, respectively are mandatory. The internship can be done by the students at local industries, Govt. Organizations, Construction agencies, Hydel and thermal power projects and in software MNCs.
ii) Evaluation of the summer internships shall be through the Departmental Committee comprising the Head of the Department as chairman and two faculty of the department including the Supervisor. A student will be required to submit a summer internship report to the concerned department and appear for an oral presentation before the departmental committee. The report and the oral presentation shall carry 40% and 60% weightages, respectively.
iii) In the final semester, the student shall mandatorily undergo internship and parallelly she shall work on a project with well-defined objectives. At the end of the semester the candidate shall submit an internship completion certificate and a project report on the work carried out. The project work shall be evaluated with an external examiner.
iv) The student internship programs shall be facilitated and monitored through a college level

committee with three senior faculty members including supervisor. Completion of internships is mandatory, if any student fails to complete internship, she will not be eligible for the award of degree. In such cases, the student shall repeat and complete the internship.

20. Curricular Framework for Skill oriented Courses (SoCs):

i) Out of the five skill courses two shall be skill-oriented courses from the same domain and shall be completed in the second year. Of the remaining 3 skill courses, one shall necessarily be a soft skill course and the remaining 2 shall be skill-advanced courses either from the same domain or Job oriented skill courses, which can be of inter disciplinary nature.

ii) The student can choose either the skill courses being offered by the department or to choose a certificate course being offered by industries / Professional bodies / APSSDC or any other accredited bodies as approved by the concerned BoS.

iii) If a student chooses to take a Certificate Course offered by Industries / Professional bodies / APSSDC or any other accredited bodies, in lieu of the skill advanced course offered by the department, the credits shall be awarded to the student upon producing the Course Completion Certificate from the agency / professional bodies as approved by the BoS.

iv) If a student prefers to take a certificate course offered by external agency, attendance shall be computed by excluding the skill course in all the calculations of mandatory attendance requirements upon producing a valid certificate as approved by the concerned HoD. The student is deemed to have fulfilled the attendance requirement of the course and acquire the credits assigned to the course.

v) The grades / marks given for a course by external agencies will be converted to the equivalent grades / marks of GVPCEW(A).

21. Community Service Project (Experiential learning through community engagement):

i) Every student should put in a minimum of 180 hours for the Community Service Project during the summer vacation.

ii) Each class/section should be assigned with a mentor

iii) Specific Departments concentrate on their major areas of concern.

iv) A log book has to be maintained by each of the student, where the activities undertaken / involved to be recorded.

v) The log book has to be countersigned by the concerned mentor/faculty incharge.

vi) Evaluation will be done based on the active participation of the student and grade will be awarded by the mentor/faculty member.

vii) The final evaluation will be reflected in the grade memo of the student.

viii) The Community Service Project should be different from the regular programmes of NSS / NCC / Green Corps/Red Ribbon Club, etc.

ix) Minor project report should be submitted by each student. An internal Viva will be conducted by a committee constituted by the principal of the college.

22. Curricular Framework for Minor Programme:

To promote interdisciplinary knowledge among the students, the students admitted into B.Tech. in a major stream/branch are eligible to obtain degree in Minor in another stream.

i) The Minor program requires completion of 12 credits in Minor stream chosen.

ii) Two courses for 06 credits related to Minor are to be pursued compulsorily for the minor degree, but maybe waived for students who have done similar/equivalent courses. If waived for a student, then the student must take an extra elective course in its place. It is recommended that students should complete the compulsory courses (or equivalents) before registering for the electives.

iii) Electives (minimum of 2 courses) to complete a total of 12 credits.

Note: A total of 4 (four) Open Electives are offered in the curriculum. A student can complete the requirement for Minor by opting for the courses offered through various verticals/tracks under Open Electives.

- **No entry conditions on CPGA/ backlogs.**

23. Curricular Framework for Honors:

i) Students of a department / discipline are eligible to opt for Honors Programme offered by the same department / discipline and can select the additional and advanced courses from their respective branch.

ii) The enrolment of student into Honors is based on the CGPA obtained in the major degree program. CGPA shall be taken up to III semester in case of regular entry students and only III semester in case of lateral entry students. Students having 7.0 CGPA without any backlog subjects will be permitted to register for Honors.

iii) A student is permitted to register for Honors in IV semester after the results of III Semester are declared and students may be allowed to take maximum two subjects per semester pertaining to the Honors from IV Semester onwards.

iv) Attendance will not be monitored for MOOC courses. Students have to acquire a certificate from the agencies approved by the BoS with grading or marks or pass/fail. If the MOOC course is a pass/fail course without any grades, the grade shall be assigned as per the recommendations of the Academic Council.

v) It is the responsibility of the student to acquire / complete prerequisites before taking the respective course. The courses offered in each pool shall be domain specific courses and advanced courses. Each pool can have theory as well as laboratory courses. If a course comes with a lab component, that component has to be cleared separately.

vi) If a student has already studied any course from the list prescribed for B.Tech (Honors), she shall be permitted to choose any other course listed under professional electives of the respective B.Tech. programme.

vii) If a student drops or is terminated from the Honors program, the additional credits so far earned cannot be converted into open or core electives; they will remain extra. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.

viii) Transfer of credits from Honors to regular B. Tech degree and vice-versa will not be permitted.

ix) Honors is to be completed simultaneously with a Major degree program.

Registration for Honors:

i) The students having **7.0 CPGA** without backlog subjects will be permitted to register for Honors.

ii) The eligible and interested students shall apply through the Head of the Department (HOD) of her parent department. The whole process should be completed within one week before the start of every semester. Selected students shall be permitted to register for the courses under Honors.

iii) The selected students shall submit their willingness to the principal through her parent department offering Honors. The parent department shall maintain the record of student pursuing the Honors.

iv) The students enrolled in the Honors courses will be monitored continuously. An advisor/mentor from parent department will be assigned to a group of students to monitor the progress.

v) If a student is detained due to lack of attendance either in major or in Honors, registration shall be cancelled.

vi) Honors is to be completed simultaneously with B.Tech. programme.

24. Other Common guidelines for Honors / Minor Programme:

i) A student shall be permitted only to register either for Honors or for Minor programme.

ii) Administration reserves the right to decide on the minimum enrolments for offering Honors / Minor program by the department. If a minimum enrolments criterion is not met, then the students may be permitted to register for the equivalent MOOC courses as approved in BoS.

iii) A student shall be permitted to register for Honors program at the beginning of IV semester subject to a maximum of two additional courses per semester, provided that the student must have acquired 7.0 CGPA upto the end of II semester without any backlogs. In case the III semester results are declared after the commencement of the IV semester, and if a student fails to acquire 7.0 CGPA upto III semester or failed in any of the courses, her registration for Honors program stands cancelled and she shall continue with the regular Programme. The CGPA of 7.0 has to be maintained in the subsequent semesters of regular B.Tech. programme, without any backlog in order to keep the registration for Honors programme active.

iv) The admission into Honors / Minor shall be strictly on the merit basis only. In case of a tie the GPA secured in the core courses shall be taken into consideration.

v) A student shall be permitted to appear for the end semester examinations, provided she puts up a minimum attendance of 75% in each course registered. However, condonation for shortage of attendance between 65-74% may be given on medical grounds. The student concerned will be permitted to take the end semester examination, on payment of condonation fee.

vi) The internal and end semester evaluation for Theory, Practical and Mini-Project shall be same as that of similar type of courses in regular B.Tech. programme.

vii) The Honors / Minor degree will be awarded only after successfully acquiring stipulated

Credits. A separate CGPA will be given for the Honors / Minor programme and no Class / Division will be awarded. Withdrawal from Honors / Minor programme is allowed in any semester.

viii) If a student drops or is terminated from the Honors program, the additional credits so far earned cannot be converted into free or core electives; they will remain extra. These additional courses will find mention in the transcript (but not in the degree certificate).
In such cases, the student may choose between the actual grade or a "pass (P)" grade and choose to omit the mention of the course as per the following:

a) All the courses done under the dropped Honor will be shown in the transcript and
b) None of the courses done under the dropped Honor will be shown in the transcript (implementation shall be in line with the guidelines of APSCHE / affiliating University)

ix) In case a student
a) fails to meet attendance requirement in any subject registered under Honors programme or (ii) fails in any subject registered under Honors programme or
b) fails to meet the 7.0 CGPA requirement at any point after registration,
she will be dropped from the list of students eligible for degree with Honors and they will receive B.Tech. degree only. However, such students will receive a separate grade sheet mentioning the additional courses completed by them (implementation shall be in line with the guidelines of APSCHE / affiliating University).

x) If a student gets detained due to attendance shortage / credit shortage in the regular programme, her admission in Honors shall stand cancelled.

xi) The Honors must be completed simultaneously with regular B.Tech. program within four years.

xii) The nomenclature and mention of title on the degree certificate for Honors / Minor will be in accordance with guidelines from the affiliating University.

25. Credit Transfer Policy and guidelines for courses under MOOCs (including SoCs):

i) Adoption of MOOCs is mandatory, as envisaged in the NEP 2020. As per University Grants Commission (Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2016, the Institution allows up to a maximum of 20% of the total credits (i.e., 32 Credits out of a total 160 credits) from elective courses under MOOCs during B.Tech. programme. Every student shall mandatorily complete a minimum of one course under MOOCs.

ii) Each of the 2 credit / 3 credit courses under MOOCs shall be of minimum 12 weeks duration, respectively. One faculty in-charge will be nominated for each course to monitor the registration and progression of the student. Attendance will not be counted for courses under MOOCs.

iii) The Head of the Department shall notify the list of such courses in advance. The student has to pursue and acquire a certificate for a course under MOOCs from the organizations / agencies approved by the BoS in order to earn the credits.

iv) The students may also be permitted to register for a course under MOOCs ahead of the corresponding regular semester based on the start dates of course by external agencies.

v) If a course under MOOCs is not offered during the specified semester, the same or equivalent course under MOOCs may be offered in blended mode.

vi) If the external agency is unable to conduct examination or give grades/marks due to any unavoidable circumstances, the college shall conduct examination and give grades/marks.

vii) In case a student fails in any course under MOOCs offered by college in blended mode, she shall appear in supplementary examination as and when conducted by the college.

viii) In case a student fails in any course under MOOCs offered by external agency, she may be permitted to register for the same or equivalent or any other course approved in BoS.

ix) The grades / marks given for a course under MOOCs by external agencies will be converted to the equivalent grades / marks of GVPCEW(A).

x) If the external agency declares only Pass without any grade / marks for a course under MOOCs, the college will award minimum grade corresponding to Pass criteria.

26. Academic Bank of Credits (ABC):

The Institution will implement Academic Bank of Credits (ABC) inline with the Affiliating University to promote flexibility in curriculum as per NEP 2020 to

i) provide option of mobility for learners across the universities of their choice. In case of students seeking admission through transfer from other institutes, for the credits earned so far and available in the ABC, equivalences will be drawn with the Course structure in force as per the prevailing regulations and will be considered for transfer of credits as per the approvals of BoS and Academic Council. The decision of the Academic Council is final in case of any ambiguity.

ii) provide option to gain the credits through MOOCs from approved digital platforms.

iii) facilitate award of certificate/diploma/degree in line with the accumulated credits in ABC

iv) execute Multiple Entry and Exit system with credit count, credit transfer and credit acceptance from students' account.

27. Multiple Entry / Exit Option:

(a) **Exit Policy:**

The students can choose to exit the four-year programme at the end of the first / second / third year.

i) UG Certificate in (Field of study/discipline) - Programme duration: First year (first two semesters) of the undergraduate programme, 40 credits (39 credits at the end of I year and another course for 1 credit), followed by an additional exit 10-credit bridge course(s) lasting two months, including at least 6- credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

ii) UG Diploma (in Field of study/discipline) - Programme duration: First two years (first four semesters) of the undergraduate programme, 80.5 credits followed by an additional exit 10- credit bridge course(s) lasting two months, including at least 6- credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

iii) Bachelor of Science (in Field of study/discipline) i.e., B.Sc. Engineering in (Field of study/discipline)- Programme duration: First three years (first six semesters) of the undergraduate programme, 124 credits.

(b) Entry Policy:

Modalities on multiple entry by the student into the B.Tech. programme will be as per the directions of the affiliating University and regulatory authorities from time to time.

28. Student Transfers:

Student transfers shall be as per the guidelines issued by the Government of Andhra Pradesh and the concerned Universities from time to time.

General:

i) The academic regulations should be read as a whole for the purpose of any interpretation.

ii) In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman, Academic Council is final.

iii) The College may change or amend the Academic regulations or syllabi at any time as per the directions of the Academic Council and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the College.

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ACADEMIC REGULATIONS
FOR STUDENTS ADMITTED THROUGH LATERAL ENTRY

The duration of the programme for the degree of B.Tech. for lateral entry students will be three academic years, with two semesters in each year. However, if a student cannot complete within 3 years, she can do so by taking more time but not more than 6 years from the year of first admission.

1. Structure of the Programme:

<table>
<tr><th>Semester</th><th colspan="2">Composition</th><th>Credits</th></tr>
<tr><td>III</td><td>5 Theory + 3 Labs + 1 skill Lab
[20-21.5 Credits]</td><td rowspan="2">Includes
Non-Credit Mandatory Courses
PEUHV & NCC/NSS/ES</td><td rowspan="2">41.5 Credits</td></tr>
<tr><td>IV</td><td>5 Theory + 2 Labs + 1 skill Lab
[20-21.5 Credits]</td></tr>
<tr><td colspan="4">Intern-I: 2 Months Community oriented Internship (CSP-Mandatory) during summer vacation</td></tr>
<tr><td>V</td><td>3 Theory + 2 Labs +
1 PE+ 1 OE + 1 skill course +
Internship-I [22-23.5 Credits]</td><td rowspan="2">Includes
Non-Credit Mandatory
Courses</td><td rowspan="2">43.5 Credits</td></tr>
<tr><td>VI</td><td>3 Theory + 3 Labs
+ 1 PE + 1 OE + 1 skill course
[20-21.5 Credits]</td></tr>
<tr><td colspan="4">Intern-II: 2 Months Industrial/Research Internship (Mandatory) during summer vacation</td></tr>
<tr><td>VII</td><td>3 PE + 2 OE +1 HSSE+1 skill
course + Industrial Internship-II
[22 credits]</td><td></td><td>22 Credits</td></tr>
<tr><td>VIII</td><td>Project work / Internship in
Industry
[14 credits]</td><td></td><td>14 Credits</td></tr>
<tr><td colspan="3">Total Credits for Lateral programme</td><td>121Credits</td></tr>
</table>

Non-credit Mandatory Courses: Environmental Sciences, Human Values & Professional Ethics, Indian Constitution, Essence of Indian Traditional Knowledge

2. Promotion Rules:

A student shall fulfill the minimum attendance requirements in every semester for promotion to next semester.

3. Minimum Academic Requirement for the award of degree:

A. Eligibility for the award of degree:

A student shall be eligible for the award of the B.Tech. degree/ B.Tech. degree with Minor if

she fulfills the following conditions:

i) Register and successfully complete all the courses prescribed within the stipulated period.
ii) Earn 121 credits for B.Tech. degree/ earn 12 credits within 121 credits for B.Tech. with Minor degree and pass in all non-credit mandatory courses
iii) Secure satisfactory grade in social activity
iv) No disciplinary action is pending against her
v) Pays the prescribed fee for all the years.

B. Eligibility for the award of degree with Honors:

A student shall be eligible for the award of degree with Honors in a specific specialization if she satisfies conditions i, iii, iv, v cited above (3.A) and earns 15 credits in addition to 121 Credits.

4. All other regulations shall be same as that of the regulations applicable to regular students.

General:

i) The academic regulations should be read as a whole for the purpose of any interpretation.
ii) In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman, Academic Council is final.
iii) The College may change or amend the Academic regulations or syllabi at any time as per the directions of the Academic Council and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the College.

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TRANSITORY REGULATIONS
FOR RE-ADMITTED STUDENTS

i) When a student is detained due to lack of credits / shortage of attendance, she may be re-admitted after fulfillment of academic requirements and as and when the semester is offered. In such case, she will be in the academic regulations into which she is readmitted.

ii) Credit equivalences will be drawn for the students re-admitted into latest regulations from the earlier regulations. A Student has to register for the substitute / compulsory / pre-requisite courses identified by the respective Boards of Studies.

iii) The student has to register for substitute courses, attend the classes and pass in examination and earn the credits.

iv) The student has to register for compulsory courses, attend the classes and pass in examination

v) For the subject(s) failed in earlier semesters (before re-admission), the student has to acquire credits from the supplementary examinations as and when conducted.

vi) In the case of transferred students from other University / College, an equivalent course structure shall be prepared by the BoS of the respective department considering the suitable credits already acquired at the previous institution.

vii) The students detained in earlier Regulations (under JNTU-K affiliation) and to be readmitted into R-24 Regulations (under AU affiliation) shall also follow the above guidelines subject to the approval from both the Universities.

viii) The decision of the Principal is final on any other clarification in this regard.

General:

i) The academic regulations should be read as a whole for the purpose of any interpretation.

ii) In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman, Academic Council is final.

iii) The College may change or amend the Academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the College.

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MALPRACTICES RULES
DISCIPLINARY ACTION FOR - IMPROPER CONDUCT IN EXAMINATIONS

S No	Nature of Malpractices/Improper conduct *If the candidate:*	Suggested Punishment
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which she is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellationof the performance in that subject only.
1. (b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, she will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled.
3.	Impersonates any other candidate in connectionwith the examination.	The candidate who has impersonated shall be expelledfrom examination hall. The candidate is also debarredand forfeits the seat. The performance of the originalcandidate who has been impersonated, shall be cancelledin all the subjects of the examination (includingpracticals and project work) already appeared and shall not be allowed to appear for examinations of theremaining subjects of that semester/year. The candidateis also debarred for two consecutive semesters from classwork and all examinations. The continuation of thecourse by the candidate is subject to the academic regulations in connection with forfeiture of seat. If theimposter is an outsider, she will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation ofperformance in that subject and all the other subjects thecandidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjectsof that semester/year. The candidate is also debarred fortwo consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.

S No	Nature of Malpractices/Improper conduct If the candidate:	Suggested Punishment
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requestinghim to award pass marks.	Cancellation of the performance in that subject.
.6	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in- charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects thecandidate(s) has (have) already appeared and shall notbe permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.

S No	Nature of Malpractices/Improper conduct If the candidate:	Suggested Punishment
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the college expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Committee appointed by the Principal for further action and impose suitable punishment.	

Suitable punishment shall be awarded based on the recommendations of a committee constituted in this regard.

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Principal
G V.P College of Engineering (a)
Madhurawada
Visakhapatnam-530

Ragging

Prohibition of ragging in educational institutions Act 26 of 1997

Salient Features

- Ragging within or outside any educational institution is prohibited.
- Ragging means doing an act which causes or is likely to cause Insult or Annoyance of Fear or Apprehension or Threat or Intimidation or outrage of modesty or Injury to a student.

	Imprisonment upto		Fine Upto
Teasing, Embarrassing and Humiliation	6 Months	+	Rs. 1,000/-
Assaulting or Using Criminal force or Criminal intimidation	1 Year	+	Rs. 2,000/-
Wrongfully restraining or confining or causing	2 Years	+	Rs. 5,000/-
Causing grievous hurt, kidnapping or Abducts or rape or committing unnatural offence	5 Years	+	Rs. 10,000/-
Causing death or abetting suicide	10 Months	+	Rs. 50,000/-

Ragging

ABSOLUTELY NO TO RAGGING

1. Ragging is prohibited as per Act 26 of A.P. Legislative Assembly, 1997.
2. Ragging entails heavy fines and/or imprisonment.
3. Ragging invokes suspension and dismissal from the College.
4. Outsiders are prohibited from entering the College and Hostel without permission.
5. Girl students must be in their hostel rooms by 7.00 p.m.
6. All the students must carry their Identity Cards and show them when demanded
7. The Principal and the Wardens may visit the Hostels and inspect the rooms any time.

ANNEXURE - III

ACADEMIC RULES AND REGULATIONS (R-24)

FOR M.TECH. PROGRAMMES

[Under Choice Based Credit System in line with NEP 2020]

[Effective from 2024-25 admitted batch)

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)
MADHURAWADA, VISAKHAPATNAM 530048
AFFILIATED TO ANDHRA UNIVERSITY, VISAKHAPATNAM

ACADEMIC REGULATIONS

FOR M.TECH. PROGRAMMES

(Under Choice Based Credit System effective from 2024-25 admitted batch)

These Regulations shall be called the "Gayatri Vidya Parishad College of Engineering for Women (Autonomous) Regulations- 2024 for the Award of M. Tech. Degree".

These regulations shall be applicable for students enrolling for M.Tech. Degree programmes at the Institute from Academic Year 2024-25.

Admission to the above program shall be made subject to the eligibility, qualifications and specialization as per the guidelines prescribed by the APSCHE, AICTE and Andhra University from time to time. The medium of instruction for course work and examinations at the Institute shall be English.

The duration of the programme for the Master of Technology degree will be two academic years, with two semesters in each year. However, if a student cannot complete within 2 years, she can do so by taking more time but not more than 4 years from the year of first admission.

1. Structure of the Programme:

Semester	No. of courses & Corresponding Credits		Credits
I	2 Theory + PE-I + PE-II + Research Methodology & IPR + Audit course+2 Core Lab	2*3 + 3 + 3 + 2 + 2*1.5	17
II	2 Theory + PE-III + PE-IV + Audit course + 2 Core Lab + 1 Mini Project with Seminar	2*3 + 3 + 3 + 2 *2+1.5	17
III	PE-V+OE+ Dissertation (Phase-I) + Industrial Training	1*3 + 1*3 + 10+2	18
IV	Dissertation (Phase-II)	16	16
		TOTAL	68

PE: Professional Elective; **OE**: Open Elective

The credits are allotted as:
1 Hr. Lecture (L) per week - 1 credit
1 Hr. Practical (P) per week - 0.5 credits.
Audit Courses carry no credits.

2. Registration:

A student shall register for courses in each semester at the beginning, from I semester onwards according to the choice provided and courses offered by the concerned department.

3. Attendance Requirements:

i) A student shall be eligible to appear for end semester examinations if she acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester.

- In the case of students who participate in activities like NSS, NCC, sports, intercollegiate tournaments conducted at National level/State Level/ University Level with prior approval of the Principal, the candidate may be deemed to have attended the college during the actual period of such activity, solely for the purpose of attendance.
- Participating in the seminar, workshop, conference with prior approval of the Principal, the candidate may be deemed to have attended the college during the actual period of such activity, solely for the purpose of attendance permission. The maximum period of such events is limited to 10 days.
- In the case of students admitted under special circumstances (late admission / transfer etc.,), the candidate shall attend at least 50% of the total classes held during semester and shall have attended at least 75% of the total classes held from the date of admission.

ii) Condonation for shortage of attendance in aggregate up to 10% (greater than 65% and less than75%) in each semester may be granted on medical grounds. A stipulated fee shall be payable to the college towards condonation of shortage of attendance.

iii) Students whose shortage of attendance is not condoned in any semester are detained and are not eligible to take their end semester examination of that class and their registration shall stand cancelled.

iv) A student will not be promoted to the next semester unless she satisfies the attendance requirements of the present semester, as applicable. They shall seek readmission and continue her course of study from that semester when offered next.

4. Method of Evaluation:

The performance of a student in each semester shall be evaluated through Continuous Internal Evaluation and End Semester Examination. The student shall earn the credits in the respective courses by obtaining at least the marks as specified in the pass criteria given below:

S.No	Type of Course	Continuous Internal Evaluation	End Semester Examination (3 hours)		Pass Criteria
			Max Marks	Evaluation	
1.	Professional core/ Professional Elective/ Open Elective/ Research Methodology & IPR Courses	30 Marks Evaluation process: 20 marks (Two internal tests each for 20 marks.) 10 marks (Two assessments 1 before mid1 and 1 before mid2 by at least any	70 Marks (Through a panel of paper setters)	Professional core (Double Valuation) and Professional Elective/ Open Elective/ Research Methodology & IPR Courses (Single Valuation)	**40% (28 marks) from End semester and 50% (50 marks) on aggregate from Internal and End semester Examination**

		two of the following methods each for 10 marks. (Assessment Methods: Assignment / Term paper / / seminar / Case study / Projects /Any other Teacher specific method). 2:1 weighted averaged marks with the higher score carrying a weightage of 2 shall be considered.			**put together.**
5.	Practical Courses	50 Marks 20 marks (day-wise performance including observation, viva & record) 30 marks (from internal examinations at the end of the semester).	50 Marks (Internal)	Single Valuation (Based on report of a lab activity-based project on the course conducted by concerned teacher and a senior expert in the subject from the same department)	**50% (25 marks) from End semester Examination and 50% (50 marks) on aggregate from Internal and End semester Examinations put together.**
6.	Non-credit Audit courses	100 Marks	-	Single Valuation	**40% (40 Marks) from End Semester Examination.** **No marks or letter grade shall be allotted for all the non-credit Audit courses.**

7.	Mini Project with Seminar	100 Marks	-	Single Valuation Through an Internal committee (comprising of HoD, Supervisor and a senior faculty of the department) based on Report (50%), Presentation and Viva-voce (50%).	**50% (50 Marks) from Report, Presentation and Viva-voce.**
8.	Dissertation work Phase I & II	Phase I (100 marks) Phase II (30 marks) (details mentioned in point 5 g & h)	Phase II (70 marks)	Single Valuation Through a board consisting of the supervisor, Head of the Department and the external examiner	**PASS in both Phase I & II**

Note 1: If a student misses both the mid examinations in an ongoing semester, then on satisfactory medical grounds, she is permitted to take a re-test before external examination of that semester based on either mid-I or mid-II syllabus and 80% of the marks will only be considered.

4.1 (a) Valuation of scripts:

For both single and double valuation, a chief examiner shall be appointed for each theory course to monitor the valuation process and evaluate atleast 10% of scripts per bundle at random for which the marks awarded by the chief examiner shall be final.
In case of double valuation, in addition to the above,

i) If the difference between the first and second valuations is less than or equal to 10 marks (15% of 70 marks), the better of the two valuations shall be awarded.

ii) If the difference between the first and second valuations is more than 10 marks (15% of 70 marks), the chief examiner shall value the script. Out of the three valuations, the average of marks obtained in third valuation and the marks obtained nearer to third valuation out of first two valuations shall be considered.

4.1 (b) Revaluation:

i) Revaluation of any theory subject shall be entertained within a stipulated period on payment of specified fee.

ii) There is no revaluation for any lab subjects/practical subjects/skill-oriented courses.

4.2 Audit Courses:

A student shall register for the audit courses (as approved in BoS) in online (MOOCs) / offline mode and appear for examination to be conducted by the college.

i) The students may be permitted to register for audit course under MOOCs ahead of the corresponding regular semester based on the start dates of course by external agencies.

ii) If the audit course is not offered under MOOCs during the specified semester, the same or its

equivalent course under MOOCs may be offered in blended mode.

4.3 Pedagogy training / Industrial training:

Training shall be for a period of at least 4 weeks during III semester and a report has to be submitted. The assessment shall be carried out for 100 marks by an internal evaluation committee comprising Head of the Department, Faculty advisor and another faculty of the department.

4.4 Supplementary examinations:

Supplementary examinations will be conducted only with the corresponding regular examinations.

If a student fails in final semester Project Work, the student shall appear for supplementary examination as and when conducted.

5. EVALUATION OF DISSERTATION WORK:

Every candidate shall be required to submit the dissertation work after taking up a topic approved by the Departmental Research Committee (DRC).

i) A Departmental Research Committee (DRC) shall be constituted with HoD as Chairman, two senior faculty (at least one from each specialization) as members along with the supervisor to oversee the progress of the dissertation work from selection of topic to submission.

ii) A Central Research Committee (CRC) shall be constituted with a Professor as Chair Person and one representative from each department nominated by the Principal.

iii) Registration of Dissertation Work: A candidate shall register for the Dissertation work at the beginning of the second year, only after satisfying the attendance requirement of all the courses up to II semester. The duration of the dissertation work is for two semesters.

iv) After satisfying 5c, a candidate has to submit, in consultation with the supervisor, the title, objective and plan of action of dissertation work to the DRC for its approval. Only after obtaining the approval of DRC, the student can initiate the dissertation work.

v) Change of topic of the dissertation work or supervisor, if necessary, shall be with the approval of the DRC. In such case, the date of registration for the dissertation work shall be the date of change of Supervisor or topic.

vi) Evaluation of the dissertation work shall be done in two phases, one at the end of the III Semester and the other during the IV Semester.

vii) The evaluation of the dissertation work (Phase-I) at the end of III semester shall be carried out through DRC1 for 100 marks based on the presentation made by the student on the topic selected, literature survey and the progress of the work. The student shall PASS in dissertation work (Phase-I) by securing at least 50 marks. Otherwise, the student shall reappear for DRC1 with improvised work to secure PASS. Only those students who secure a PASS in dissertation work (Phase-I) shall be permitted to proceed for the dissertation work (Phase-II) in IV semester.

viii) The evaluation of the dissertation work (Phase-II) during IV semester shall be carried out for a total of 100 marks through DRC2 (10 marks), DRC3 (10 marks), CRC (10 marks) and final viva-voce examination (70 marks).

ix) A candidate shall be permitted to submit her dissertation only after acquiring credits of

all theory and practical course with the approval of CRC but not earlier than 40 weeks from the date of registration of the Dissertation work. The candidate shall make an oral presentation before the CRC and after the approval by CRC, plagiarism check shall be conducted for the Dissertation (Similarity Index shall not exceed 30%) and shall submit a draft copy to the Principal through the concerned Head of the Department.

x) Three copies of the dissertation certified by the Supervisor shall be submitted in the department after approval by the CRC.

xi) For the purpose of adjudication of the dissertation, an external examiner shall be selected by the Principal or his nominee from a panel of examiners in the program specialization proposed and approved in the BoS meeting.

xii) The final evaluation of dissertation (Phase-II), i.e., viva-voce examination, for 50 marks, shall be conducted by a board consisting of the supervisor, Head of the Department and the external examiner.

xiii) A student is deemed to be passed in dissertation (Phase-II) of IV semester, if he secures at least 25 marks (50%) in the final viva-voce examination and at least 50 marks (50%) out of a total 100 marks through DRC2, DRC3, CRC, and final viva-voce examination. If a student fails in Dissertation (Phase-II), he/she shall revise and resubmit the dissertation, in a time frame prescribed by the CRC.

xiv) The overall Dissertation Grade Point Average (DGPA), shall be computed based on the grade points secured in Phase-I (III semester) and Phase-II (IV semester) as:

xv) $DGPA = \Sigma(Ci \times Gi) / \Sigma Ci$

xvi) where Ci is the number of credits of the ith phase and Gi is the grade point scored by the student in the ith phase.

6. ACADEMIC REQUIREMENTS:

i) A student shall secure a PASS in all courses (except in audit courses) and earn 68 credits to be eligible for the award of the M.Tech. degree.

ii) A student shall register for the audit courses (as approved in BoS) in online / offline mode and appear for examination to be conducted by the college.

7. GRADING SYSTEM:

Absolute grading system shall be followed for the award of grades.

Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale.

Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P and F.

Based on the marks secured, a Letter Grade is awarded as per the following:

Grades and Grade Points

Marks Range		Letter Grade		Grade Point
Theory (including Mandatory courses)	Practical, Drawing, Design Thinking, SoCs, Internships, Project			
> 90 to ≤ 100	> 90 to ≤ 100	O	Outstanding	10
> 80 to ≤ 90	> 80 to ≤ 90	A+	Excellent	9
> 70 to ≤ 80	> 70 to ≤ 80	A	Very Good	8
> 60 to ≤ 70	> 60 to ≤ 70	B+	Good	7
> 55 to ≤ 60	> 55 to ≤ 60	B	Above Average	6
≥ 50 to ≤ 55	≥ # 50 to ≤ 55	C	Average	5
≥ *40 to < 50	-	P	Pass	4
< 40	-	F	Fail	0
		Ab	Absent	0

* Pass mark for Theory courses, # Pass mark for all other courses

Calculation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

i) The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.

$$SGPA = \Sigma (Ci \times Gi) / \Sigma Ci$$

where, Ci is the number of credits of the ith subject and Gi is the grade point scored by the student in the ith course

ii) The CGPA will be computed in the same manner taking into account all the courses undergone by a student over all the semesters of a program, i.e.

$$CGPA = \Sigma (Ci \times Si) / \Sigma Ci$$

where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester. CGPA is calculated from II semester onwards up to the final semester, considering all the courses offered from the First semester onwards.

iii) Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts. CGPA is calculated for those who clear all the courses including present semester.

iv) While computing the SGPA/CGPA, the subjects in which the student is awarded Zero grade points will also be included.

v) A candidate has to secure a minimum of 6.0 SGPA for a pass in each semester.

The award of CLASS / DIVISION is as per the following:

Class Awarded	CGPA Secured
First class with distinction	≥ 7.0 (within two years and without any supplementary appearance in any semester)
First class	≥ 6.0 and < 7.0

CGPA to Percentage of Marks: Equivalent percentage of marks = **CGPA*10**

8. AWARD OF M.TECH. DEGREE:

A student shall be declared eligible for the award of the M.Tech. degree, if she pursues the course of study and satisfies the following:

i) Earn 68 credits in not less than two academic years and not more than four academic years from the year of first admission.
ii) Earn a minimum of 6.0 CGPA from all courses.
iii) No disciplinary action pending against her.
iv) Pays the prescribed fee for all the years.

9. WITHHOLDING OF RESULT:

The result of a student in a semester shall be withheld and not declared if the student has disciplinary action pending against her.

TRANSITORY REGULATIONS

i) When a student is detained due to lack of credits / shortage of attendance, she may be re-admitted after fulfillment of academic requirements and as and when the semester is offered. In such case, she shall be in the academic regulations into which she is readmitted.

ii) Credit equivalences shall be drawn for the students re-admitted into latest regulations from the earlier regulations. A Student has to register for the substitute / compulsory / pre-requisite courses identified by the respective Boards of Studies.

iii) The student has to register for substitute courses, attend the classes and pass in examination and earn the credits.

iv) The student has to register for compulsory courses, attend the classes and pass in examination.

v) For the subject(s) failed in earlier semesters (before re-admission), the student has to acquire credits from the supplementary examinations as and when conducted.

vi) In case of transferred students from other University / College, an equivalent course structure shall be prepared by the BoS of the respective department considering the suitable credits already acquired at the previous institution.

vii) The decision of the Principal will be final on any other clarification in this regard.

General:

i) The academic regulation should be read as a whole for the purpose of any interpretation.

ii) In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman, Academic Council is final.

iii) The college may change or amend the academic regulations or syllabi from time to time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the college.

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MALPRACTICES RULES
DISCIPLINARY ACTION FOR - IMPROPER CONDUCT IN EXAMINATIONS

S No	Nature of Malpractices/Improper conduct	Suggested Punishment
	If the candidate:	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which she is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellationof the performance in that subject only.
1. (b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, she will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled.
3.	Impersonates any other candidate in connectionwith the examination.	The candidate who has impersonated shall be expelledfrom examination hall. The candidate is also debarredand forfeits the seat. The performance of the originalcandidate who has been impersonated, shall be cancelledin all the subjects of the examination (includingpracticals and project work) already appeared and shall not be allowed to appear for examinations of theremaining subjects of that semester/year. The candidateis also debarred for two consecutive semesters from classwork and all examinations. The continuation of thecourse by the candidate is subject to the academic regulations in connection with forfeiture of seat. If theimposter is an outsider, she will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation ofperformance in that subject and all the other subjects thecandidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjectsof that semester/year. The candidate is also debarred fortwo consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.

S No	Nature of Malpractices/Improper conduct	Suggested Punishment
	If the candidate:	
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
.6	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.

S No	Nature of Malpractices/Improper conduct If the candidate:	Suggested Punishment
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the college expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Committee appointed by the Principal for further action and impose suitable punishment.	

Suitable punishment shall be awarded based on the recommendations of a committee constituted in this regard.

* * * * *

Principal
V.P College of Engineering for Wo
Madhurawada
Visakhapatnam-530048

Ragging

Prohibition of ragging in educational institutions Act 26 of 1997

Salient Features

- Ragging within or outside any educational institution is prohibited.
- Ragging means doing an act which causes or is likely to cause Insult or Annoyance of Fear or Apprehension or Threat or Intimidation or outrage of modesty or Injury to a student.

	Imprisonment upto		Fine Upto
Teasing, Embarrassing and Humiliation	6 Months	+	Rs. 1,000/-
Assaulting or Using Criminal force or Criminal intimidation	1 Year	+	Rs. 2,000/-
Wrongfully restraining or confining or causing	2 Years	+	Rs. 5,000/-
Causing grievous hurt, kidnapping or Abducts or rape or committing unnatural offence	5 Years	+	Rs. 10,000/-
Causing death or abetting suicide	10 Months	+	Rs. 50,000/-

Ragging

ABSOLUTELY NO TO RAGGING

1. Ragging is prohibited as per Act 26 of A.P. Legislative Assembly, 1997.
2. Ragging entails heavy fines and/or imprisonment.
3. Ragging invokes suspension and dismissal from the College.
4. Outsiders are prohibited from entering the College and Hostel without permission.
5. Girl students must be in their hostel rooms by 7.00 p.m.
6. All the students must carry their Identity Cards and show them when demanded
7. The Principal and the Wardens may visit the Hostels and inspect the rooms any time.







MODEL ENGINEERING CURRICULUM – 2023

B. Tech Regular / Honors

ANDHRA PRADESH
STATE COUNCIL OF HIGHER EDUCATION

(A Statutory Body of the Government of A.P)

COMMITTEE MEMBERS

S. No	Name	Designation
1	**Prof. K.V. Satyanarayana,** Director, IIT Tirupati	Chairman
2	**Prof. K. Krishnaiah,** Professor (Retd.), IIT Tirupati	Member
3	**Prof. N.V. Ramana Rao,** Director, NIT	Member
4	**Prof. G. Ranga Janardhana,** VC, JNTUA, Anantapur	Member
5	**Prof. G.V.R. Prasada Raju,** VC, JNTUK, Kakinada	Member
6	**Prof. K. Venkatasubbaiah,** Vice Chancellor, JNTUGV, Gurajada, Vizianagaram	Member
7	**Sri. Srinath,** IT Advisor, Govt., of Andhra Pradesh	Member
8	**Smt. Sridevi Sira,** Academic Lead, NASSCOM	Member
9	**Prof. V. Sumalatha,** JNTUA, Anantapur	Special Invitee
10	**Prof. Y. Nazeer Ahammed,** Secretary, APSCHE Member Convener	Convener

MODEL ENGINEERING CURRICULUM - 2023

B. Tech Regular/Honors

ANDHRA PRADESH
STATE COUNCIL OF HIGHER EDUCATION
(A Statutory body of the Government of A.P.)
2nd to 6th floors, Neeladri Towers, Sri Ram Nagar, 6th Battalion Road Atmakur (V),
Mangalagiri (M), Guntur-522503
Web: https://apsche.ap.gov.in, E-mail: secretaryapsche@gmail.com

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- Fundamental Chemistry Lab
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Academic Regulations (R23) for B. Tech (Regular/Honors)

(Effective for the students admitted into I year from
the Academic Year **2023-24** onwards)

1. **Award of the Degree**
   (a) Award of the B.Tech. Degree / B.Tech. Degree with a Minor if he/she fulfils the following:
      (i) Pursues a course of study for not less than four academic years and not more than eight academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would in addition to the maximum period permitted for graduation (Eight years).
      (ii) Registers for 160 credits and secures all 160 credits.

   (b) Award of B.Tech. degree with Honors if he/she fulfils the following:
      (i) Student secures additional 15 credits fulfilling all the requisites of a B.Tech. program i.e., 160 credits.
      (ii) Registering for Honors is optional.
      (iii) Honors is to be completed simultaneously with B.Tech. programme.

2. Students, who fail to fulfil all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech. course and their admission stands cancelled. This clause shall be read along with clause 1 a) i).

3. **Admissions**
   Admission to the B. Tech Program shall be made subject to the eligibility, qualifications and specialization prescribed by the A.P. State Government/University from time to time. Admissions shall be made either based on the merit rank obtained by the student in the common entrance examination conducted by the A.P. Government/University or any other order of merit approved by the A.P. Government/University, subject to reservations as prescribed by the Government/University from time to time.

4. **Program related terms**
   Credit: A unit by which the course work is measured. It determines the number of hours of instruction required per week. One credit is equivalent to one hour of teaching (Lecture/Tutorial) or two hours of practical work/field work per week.

   Credit Definition:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 Hr. Practical (P) per week	0.5 credit
2 Hrs. Practical (Lab) per week	1 credit

a) Academic Year: Two consecutive (one odd + one even) semesters constitute one academic year.

b) Choice Based Credit System (CBCS): The CBCS provides a choice for students to select from the prescribed courses.

5. Semester/Credits:

i) A semester comprises 90 working days and an academic year is divided into two semesters.

ii) The summer term is for eight weeks during summer vacation. Internship/ apprenticeship / work-based vocational education and training can be carried out during the summer term, especially by students who wish to exit after two semesters or four semesters of study.

iii) Regular courses may also be completed well in advance through MOOCs satisfying prerequisites.

6. Structure of the Undergraduate Programme

All courses offered for the undergraduate program (B. Tech.) are broadly classified as follows:

S.No.	Category	Breakup of Credits (Total 160)	Percentage of total credits	AICTE Recommendation (%)
1.	Humanities and Social Science including Management (HM)	13	8 %	8 – 9%
2.	Basic Sciences (BS)	20	13 %	12 - 16%
3.	Engineering Sciences (ES)	23.5	14%	10 – 18%
4.	Professional Core (PC)	54.5	34 %	30 – 36%
5.	Electives – Professional (PE) & Open (OE); Domain Specific Skill Enhancement Courses (SEC)	33	21 %	19 - 23%
6.	Internships & Project work (PR)	16	10 %	8 – 11%
7.	Mandatory Courses (MC)	Non-credit	Non-credit	-

7. Course Classification:

All subjects/ courses offered for the undergraduate programme in Engineering & Technology (B.Tech. degree programmes) are broadly classified as follows:

S.No.	Broad Course Classification	Course Category	Description
1.	Foundation Courses	Foundation courses	Includes Mathematics, Physics and Chemistry; fundamental engineering courses; humanities, social sciences and management courses
2.	Core Courses	Professional Core Courses (PC)	Includes subjects related to the parent discipline/department/branch of Engineering
3.	Elective Courses	Professional Elective Courses (PE)	Includes elective subjects related to the parent discipline/department/ branch of Engineering
		Open Elective Courses (OE)	Elective subjects which include interdisciplinary subjects or subjects in an area outside the parent discipline/ department/ branch of Engineering
		Domain specific skill enhancement courses (SEC)	interdisciplinary/job-oriented/domain courses which are relevant to the industry
4.	Project & Internships	Project	B.Tech. Project or Major Project
		Internships	Summer Internships – Community based and Industry Internships; Industry oriented Full Semester Internship
5.	Audit Courses	Mandatory non-credit courses	Covering subjects of developing desired attitude among the learners

8. Programme Pattern

i. Total duration of the of B. Tech (Regular/Honors) Programme is four academic years.
ii. Each academic year of study is divided into two semesters.
iii. Minimum number of instruction days in each semester is 90 days.
iv. There shall be mandatory student induction program for freshers, with a three-week duration before the commencement of first semester. Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations etc., are included as per the guidelines issued by AICTE.
v. Health/wellness/yoga/sports and NSS /NSS /Scouts & Guides / Community service activities are made mandatory as credit courses for all the undergraduate students.
vi. Courses like Environmental Sciences, Indian Constitution, Technical Paper Writing & IPR are offered as non-credit mandatory courses for all the undergraduate students.
vii. Design Thinking for Innovation & Tinkering Labs are made mandatory as credit courses for all the undergraduate students.
viii. Increased flexibility for students through an increase in the elective component of the curriculum, with 05 Professional Elective courses and 04 Open Elective courses.

ix. Professional Elective Courses, include the elective courses relevant to the chosen specialization/branch. Proper choice of professional elective courses can lead to students specializing in emerging areas within the chosen field of study.

x. A total of 04 Open Electives are offered in the curriculum. A student can complete the requirement for B.Tech. Degree with a Minor within the 160 credits by opting for the courses offered through various verticals/tracks under Open Electives.

xi. While choosing the electives, students shall ensure that they do not opt for the courses with syllabus contents similar to courses already pursued.

xii. A pool of interdisciplinary/job-oriented/domain skill courses which are relevant to the industry are integrated into the curriculum of all disciplines. There shall be 05 skill-oriented courses offered during III to VII semesters. Among the five skill courses, four courses shall focus on the basic and advanced skills related to the domain/interdisciplinary courses and the other shall be a soft skills course.

xiii. Students shall undergo mandatory summer internships, for a minimum of eight weeks duration at the end of second and third year of the programme. The internship at the end of second year shall be community oriented and industry internship at the end of third year.

xiv. There shall also be mandatory full internship in the final semester of the programme along with the project work.

xv. Undergraduate degree with Honors is introduced by the University for the students having good academic record.

xvi. Each college shall take measures to implement Virtual Labs (https://www.vlab.co.in) which provide remote access to labs in various disciplines of Engineering and will help student in learning basic and advanced concept through remote experimentation. Student shall be made to work on virtual lab experiments during the regular labs.

xvii. Each college shall assign a faculty advisor/mentor after admission to a group of students from same department to provide guidance in courses registration/career growth/placements/opportunities for higher studies/GATE/ other competitive exams etc.

xviii. Preferably 25% of course work for the theory courses in every semester shall be conducted in the blended mode of learning.

9. Evaluation Process

The performance of a student in each semester shall be evaluated subject wise with a maximum of 100 marks for theory and 100 marks for practical subject. Summer Internships shall be evaluated for 50 marks, Full Internship &Project work in final semester shall be evaluated for 200 marks, mandatory courses with no credits shall be evaluated for 30 mid semester marks.

A student has to secure not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the mid semester and end examination marks taken together for the theory, practical, design, drawing subject or project etc. In case of a mandatory course, he/she should secure 40% of the total marks.

Theory Courses

Assessment Method	Marks
Continuous Internal Assessment	30
Semester End Examination	70
Total	**100**

i) For theory subject, the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.
ii) For practical subject, the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End- Examination.
iii) If any course contains two different branch subjects, the syllabus shall be written in two parts with 3 units each (Part-A and Part-B) and external examination question paper shall be set with two parts each for 35 marks.
iv) If any subject is having both theory and practical components, they will be evaluated separately as theory subject and practical subject. However, they will be given same subject code with an extension of 'T' for theory subject and 'P' for practical subject.

a) Continuous Internal Evaluation

i) For theory subjects, during the semester, there shall be two midterm examinations. Each midterm examination shall be evaluated for 30 marks of which 10 marks for objective paper (20 minutes duration), 15 marks for subjective paper (90 minutes duration) and 5 marks for assignment.
ii) Objective paper shall contain for 05 short answer questions with 2 marks each or maximum of 20 bits for 10 marks. Subjective paper shall contain 3 either or type questions (totally six questions from 1 to 6) of which student has to answer one from each either-or type of questions. Each question carries 10 marks. The marks obtained in the subjective paper are condensed to 15 marks.

Note:

- The objective paper shall be prepared in line with the quality of competitive examinations questions.
- The subjective paper shall contain 3 either or type questions of equal weightage of 10 marks. Any fraction shall be rounded off to the next higher mark.
- The objective paper shall be conducted by the respective institution on the day of subjective paper test.
- Assignments shall be in the form of problems, mini projects, design problems, slip tests, quizzes etc., depending on the course content. It should be continuous assessment throughout the semester and the average marks shall be considered.

iii) If the student is absent for the mid semester examination, no re-exam shall be conducted and mid semester marks for that examination shall be considered as zero.

iv) First midterm examination shall be conducted for I, II units of syllabus with one either or type question from each unit and third either or type question from both the

units. The second midterm examination shall be conducted for III, IV and V units with one either or type question from each unit.

v) Final mid semester marks shall be arrived at by considering the marks secured by the student in both the mid examinations with 80% weightage given to the better mid exam and 20% to the other.

For Example:

Marks obtained in first mid: 25
Marks obtained in second mid: 20
Final mid semester Marks: (25x0.8) + (20x0.2) = 24

If the student is absent for any one midterm examination, the final mid semester marks shall be arrived at by considering 80% weightage to the marks secured by the student in the appeared examination and zero to the other. For Example:

Marks obtained in first mid: Absent
Marks obtained in second mid: 25
Final mid semester Marks: (25x0.8) + (0x0.2) =20

b) End Examination Evaluation:

End examination of theory subjects shall have the following pattern:

i) There shall be 6 questions and all questions are compulsory.
ii) Question I shall contain 10 compulsory short answer questions for a total of 20marks such that each question carries 2 marks.
iii) There shall be 2 short answer questions from each unit.
a) In each of the questions from 2 to 6, there shall be either/or type questions of 10 marks each. Student shall answer any one of them.
iv) The questions from 2 to 6 shall be set by covering one unit of the syllabus for each question.

End examination of theory subjects consisting of two parts of different subjects, for Example: Basic Electrical &Electronics Engineering shall have the following pattern:

i) Question paper shall be in two parts viz., Part A and Part B with equal weightage of 35 marks each.
ii) In each part, question 1 shall contain 5 compulsory short answer questions for a total of 5 marks such that each question carries 1mark.
iii) In each part, questions from 2 to 4, there shall be either/or type questions of 10 marks each. Student shall answer any one of them.
iv) The questions from 2 to 4 shall be set by covering one unit of the syllabus for each question.

Practical Courses

Assessment Method	Marks
Continuous Internal Assessment	30
Semester End Examination	70
Total	**100**

b) For practical courses, there shall be a continuous evaluation during the semester for 30 sessional marks and end examination shall be for 70 marks.

c) Day-to-day work in the laboratory shall be evaluated for 15 marks by the concerned laboratory teacher based on the record/viva and 15 marks for the internal test.

d) The end examination shall be evaluated for 70 marks, conducted by the concerned laboratory teacher and a senior expert in the subject from the same department.
- Procedure: 20 marks
- Experimental work & Results: 30 marks
- Viva voce: 20 marks.

In a practical subject consisting of two parts (Eg: Basic Electrical &Electronics Engineering Lab), the end examination shall be conducted for 70 marks as a single laboratory in 3 hours. Mid semester examination shall be evaluated as above for 30 marks in each part and final mid semester marks shall be arrived by considering the average of marks obtained in two parts.

e) For the subject having design and/or drawing, such as Engineering Drawing, the distribution of marks shall be 30 for mid semester evaluation and 70 for end examination.

Assessment Method	**Marks**
Continuous Internal Assessment	30
Semester End Examination	70
Total	**100**

Day-to-day work shall be evaluated for 15 marks by the concerned subject teacher based on the reports/submissions prepared in the class. And there shall be two midterm examinations in a semester for duration of 2 hours each for 15 marks with weightage of 80% to better mid marks and 20% for the other. The subjective paper shall contain 3 either or type questions of equal weightage of 5 marks. There shall be no objective paper in mid semester examination. The sum of day-to-day evaluation and the mid semester marks will be the final sessional marks for the subject.

The end examination pattern for Engineering Graphics, shall consists of 5 questions, either/or type, of 14 marks each. There shall be no objective type questions in the end examination. However, the end examination pattern for other subjects related to design/drawing , multiple branches, etc is mentioned along with the syllabus.

f) There shall be no external examination for mandatory courses with zero credits. However, attendance shall be considered while calculating aggregate attendance and student shall be declared to have passed the mandatory course only when he/she secures 40% or more in the internal examinations. In case, the student fails, a re-

examination shall be conducted for failed candidates for 30 marks satisfying the conditions mentioned in item 1 & 2 of the regulations.

g) The laboratory records and mid semester test papers shall be preserved for a minimum of 3 years in the respective institutions as per the University norms and shall be produced to the Committees of the University as and when the same are asked for.

10. Skill oriented Courses

i) There shall be five skill-oriented courses offered during III to VII semesters.

ii) Out of the five skill courses two shall be skill-oriented courses from the same domain. Of the remaining three skill courses, one shall be a soft skill course and the remaining two shall be skill-advanced courses from the same domain/Interdisciplinary/Job oriented.

iii) The course shall carry 100 marks and shall be evaluated through continuous assessments during the semester for 30 sessional marks and end examination shall be for 70 marks. Day-to-day work in the class / laboratory shall be evaluated for 30 marks by the concerned teacher based on the regularity/assignments/viva/mid semester test. The end examination similar to practical examination pattern shall be conducted by the concerned teacher and an expert in the subject nominated by the principal.

iv) The Head of the Department shall identify a faculty member as coordinator for the course. A committee consisting of the Head of the Department, coordinator and a senior Faculty member nominated by the Head of the Department shall monitor the evaluation process. The marks/grades shall be assigned to the students by the above committee based on their performance.

v) The student shall be given an option to choose either the skill courses being offered by the college or to choose a certificate course being offered by industries/Professional bodies or any other accredited bodies. If a student chooses to take a Certificate Course offered by external agencies, the credits shall be awarded to the student upon producing the Course Completion Certificate from the agency. A committee shall be formed at the level of the college to evaluate the grades/marks given for a course by external agencies and convert to the equivalent marks/grades.

vi) The recommended courses offered by external agencies, conversions and appropriate grades/marks are to be approved by the University at the beginning of the semester. The principal of the respective college shall forward such proposals to the University for approval.

vii) If a student prefers to take a certificate course offered by external agency, the department shall mark attendance of the student for the remaining courses in that semester excluding the skill course in all the calculations of mandatory attendance requirements upon producing a valid certificate as approved by the University.

11. Massive Open Online Courses (MOOCs):

A Student has to pursue and complete one course compulsorily through MOOCs approved by the University. A student can pursue courses other than core through MOOCs and it is mandatory to complete one course successfully through MOOCs for awarding the degree. A student is not permitted to register and pursue core courses through MOOCs.

A student shall register for the course (Minimum of either 8 weeks or 12 weeks) offered through MOOCs with the approval of Head of the Department. The Head of the Department shall appoint one mentor to monitor the student's progression. The student needs to earn a certificate by passing the exam. The student shall be awarded the credits assigned in the curriculum only by submission of the certificate. Examination fee, if any, will be borne by the student.

Students who have qualified in the proctored examinations conducted through MOOCs platform can apply for credit transfer as specified and are exempted from appearing internal as well as external examination (for the specified equivalent credit course only) conducted by the university.

Necessary amendments in rules and regulations regarding adoption of MOOC courses would be proposed from time to time.

12. Credit Transfer Policy

Adoption of MOOCs is mandatory, to enable Blended model of teaching-learning as also envisaged in the NEP 2020. As per University Grants Commission (Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2016, the University shall allow up to a maximum of 20% of the total courses being offered in a particular programme i.e., maximum of 32 credits through MOOCs platform.

i) The University shall offer credit mobility for MOOCs and give the equivalent credit weightage to the students for the credits earned through online learning courses.
ii) Student registration for the MOOCs shall be only through the respective department of the institution, it is mandatory for the student to share necessary information with the department.
iii) Credit transfer policy will be applicable to the Professional & Open Elective courses only.
iv) The concerned department shall identify the courses permitted for credit transfer.
v) The University/institution shall notify at the beginning of semester the list of the online learning courses eligible for credit transfer.
vi) The institution shall designate a faculty member as a Mentor for each course to guide the students from registration till completion of the credit course.
vii) The university shall ensure no overlap of MOOC exams with that of the university examination schedule. In case of delay in results, the university will re-issue the marks sheet for such students.

viii) Student pursuing courses under MOOCs shall acquire the required credits only after successful completion of the course and submitting a certificate issued by the competent authority along with the percentage of marks and grades.

ix) The institution shall submit the following to the examination section of the university:
   a) List of students who have passed MOOC courses in the current semester along with the certificate of completion.
   b) Undertaking form filled by the students for credit transfer.

x) The universities shall resolve any issues that may arise in the implementation of this policy from time to time and shall review its credit transfer policy in the light of periodic changes brought by UGC, SWAYAM, NPTEL and state government.

Note: Students shall be permitted to register for MOOCs offered through online platforms approved by the University from time to time.

13. Academic Bank of Credits (ABC)

The University has implemented Academic Bank of Credits (ABC) to promote flexibility in curriculum as per NEP 2020 to

i. provide option of mobility for learners across the universities of their choice
ii. provide option to gain the credits through MOOCs from approved digital platforms.
iii. facilitate award of certificate/diploma/degree in line with the accumulated credits in ABC
iv. execute Multiple Entry and Exit system with credit count, credit transfer and credit acceptance from students' account.

14. Mandatory Internships

Summer Internships : Two summer internships either onsite or virtual each with a minimum of 08 weeks duration, done at the end of second and third years, respectively are mandatory. It shall be completed in collaboration with local industries, Govt. Organizations, construction agencies, Power projects, software MNCs or any industries in the areas of concerned specialization of the Undergraduate program. One of the two summer internships at the end of second year (Community Service Project) shall be society oriented and shall be completed in collaboration with government organizations/NGOs & others. The other internship at the end of third year is Industry Internship and shall be completed in collaboration with Industries. The student shall register for the internship as per course structure after commencement of academic year. The guidelines issued by the APSCHE / University shall be followed for carrying out and evaluation of Community Service Project and Industry Internship.

Evaluation of the summer internships shall be through the departmental committee. A student will be required to submit a summer internship report to the concerned department and appear for an oral presentation before the departmental committee comprising of Head of the Department, supervisor of the internship and a senior faculty

member of the department. A certificate of successful completion from industry shall be included in the report. The report and the oral presentation shall carry 50% weightage each. It shall be evaluated for 50 external marks. There shall be no internal marks for Summer Internship. A student shall secure minimum 40% of marks for successful completion. In case, if a student fails, he/she shall reappear as and when semester supplementary examinations are conducted by the University.

Full Semester Internship and Project work: In the final semester, the student should mandatorily register and undergo internship (onsite/virtual) and in parallel he/she should work on a project with well-defined objectives. At the end of the semester the candidate shall submit an internship completion certificate and a project report. A student shall also be permitted to submit project report on the work carried out during the internship.

The project report shall be evaluated with an external examiner. The total marks for project work 200 marks and distribution shall be 60 marks for internal and 140 marks for external evaluation. The supervisor assesses the student for 30 marks (Report: 15 marks, Seminar: 15 marks). At the end of the semester, all projects shall be showcased at the department for the benefit of all students and staff and the same is to be evaluated by the departmental Project Review Committee consisting of supervisor, a senior faculty and HOD for 30 marks. The external evaluation of Project Work is a Viva-Voce Examination conducted in the presence of internal examiner and external examiner appointed by the University and is evaluated for 140 marks.

The college shall facilitate and monitor the student internship programs. Completion of internships is mandatory, if any student fails to complete internship, he/she will not be eligible for the award of degree. In such cases, the student shall repeat and complete the internship.

15. Guidelines for offering a Minor

To promote interdisciplinary knowledge among the students, the students admitted into B.Tech. in a major stream/branch are eligible to obtain degree in Minor in another stream.

i) The Minor program requires the completion of 12 credits in Minor stream chosen.
ii) Two courses for 06 credits related to a Minor are to be pursued compulsorily for the minor degree, but maybe waived for students who have done similar/equivalent courses. If waived for a student, then the student must take an extra elective course in its place. It is recommended that students should complete the compulsory courses (or equivalents) before registering for the electives.
iii) Electives (minimum of 2 courses) to complete a total of 12 credits.

Note: A total of 4 (Four) Open Electives are offered in the curriculum. A student can complete the requirement for Minor by opting for the courses offered through various verticals/tracks under Open Electives.

16. Guidelines for offering Honors

The objective of introducing B.Tech. (Hons.) is to facilitate the students to choose additionally the specialized courses of their choice and build their competence in a specialized area in the UG level. The programme is a best choice for academically excellent students having good academic record and interest towards higher studies and research.

i) Honors is introduced in the curriculum of all B. Tech. programs offering a major degree and is applicable to all B. Tech (Regular and Lateral Entry) students admitted in Engineering & Technology.
ii) A student shall earn additional 15 credits for award of B.Tech.(Honors) degree from same branch/department/discipline registered for major degree. This is in addition to the credits essential for obtaining the Undergraduate degree in Major Discipline (i.e., 160 credits).
iii) A student is permitted to register for Honors in IV semester after the results of III Semester are declared and students may be allowed to take maximum two subjects per semester pertaining to the Honors from V Semester onwards.
iv) The concerned Principal of the college shall arrange separate class work and timetable of the courses offered under Honors program.
v) Courses that are used to fulfil the student's primary major may not be double counted towards the Honors. Courses with content substantially equivalent to courses in the student's primary Major may not be counted towards the Honors.
vi) Students can complete the courses offered under Honors either in the college or in online platforms like SWAYAM with a minimum duration of 12 weeks for a 3-credit course and 8 weeks duration for a 2-credit course satisfying the criteria for credit mobility. If the courses under Honors are offered in conventional mode, then the teaching and evaluation procedure shall be similar to regular B. Tech courses.
vii) The attendance for the registered courses under Honors and regular courses offered for Major degree in a semester are to be considered separately.
viii) A student shall maintain an attendance of 75% in all registered courses under Honors to be eligible for attending semester end examinations.
ix) A student registered for Honors shall pass in all subjects that constitute the requirement for the Honors degree program. No class/division (i.e., second class, first class and distinction, etc.) shall be awarded for Honors degree programme.
x) If a student drops or is terminated from the Honors program, the additional credits so far earned cannot be converted into open or core electives; they will remain extra. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.
xi) The Honors will be mentioned in the degree certificate as Bachelor of Technology (Honors) in XYZ. For example, B.Tech. (Honors) in Mechanical Engineering

Enrolment into Honors:

i) Students of a Department/Discipline are eligible to opt for Honors program offered by the same Department/Discipline
ii) The enrolment of student into Honors is based on the CGPA obtained in the major degree program. CGPA shall be taken up to III semester in case of regular

entry students and only III semester in case of lateral entry students. Students having 7.0 CGPA without any backlog subjects will be permitted to register for Honors.

iii) If a student is detained due to lack of attendance either in Major or in Honors, registration shall be cancelled.

iv) Transfer of credits from Honors to regular B. Tech degree and vice-versa shall not be permitted.

v) Honors is to be completed simultaneously with a Major degree program.

Registration for Honors:

i) The eligible and interested students shall apply through the Head of the Department (HOD) of his/her parent department. The whole process should be completed within one week before the start of every semester. Selected students shall be permitted to register the courses under Honors.

ii) The selected students shall submit their willingness to the principal through his/her parent department offering Honors. The parent department shall maintain the record of student pursuing the Honors.

iii) The students enrolled in the Honors courses will be monitored continuously. An advisor/mentor from parent department shall be assigned to a group of students to monitor the progress.

iv) There is no fee for registration of subjects for Honors program offered in offline at the respective institutions.

17. Attendance Requirements:

i) A student shall be eligible to appear for the University external examinations if he/she acquires a minimum of 40% attendance in each subject and 75% of attendance in aggregate of all the subjects. b) Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee.

ii) Shortage of Attendance below 65% in aggregate shall in NO CASE be condoned.

iii) A stipulated fee shall be payable towards condonation of shortage of attendance to the University.

iv) Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class and their registration shall stand cancelled.

v) A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester. They may seek readmission for that semester from the date of commencement of class work.

vi) If any candidate fulfils the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.

vii) If the learning is carried out in blended mode (both offline & online), then the total attendance of the student shall be calculated considering the offline and online attendance of the student.

viii) For induction programme attendance shall be maintained as per AICTE norms.

18. Promotion Rules:

The following academic requirements must be satisfied in addition to the attendance requirements mentioned in section 16.

i) A student shall be promoted from first year to second year if he/she fulfils the minimum attendance requirement as per university norms.

ii) A student will be promoted from II to III year if he/she fulfils the academic requirement of securing 40% of the credits (any ***decimal*** fraction should be ***rounded off*** to ***lower*** digit) up to in the subjects that have been studied up to III semester.

iii) A student shall be promoted from III year to IV year if he/she fulfils the academic requirements of securing 40% of the credits (any ***decimal*** fraction should be ***rounded off*** to ***lower*** digit) in the subjects that have been studied up to V semester.
And in case a student is detained for want of credits for a particular academic year by ii) & iii) above, the student may make up the credits through supplementary examinations and only after securing the required credits he/she shall be permitted to join in the V semester or VII semester respectively as the case may be.

iv) When a student is detained due to lack of credits/shortage of attendance he/she may be re-admitted when the semester is offered after fulfilment of academic regulations. In such case, he/she shall be in the academic regulations into which he/she is readmitted.

19. Grading:

As a measure of the student's performance, a 10-point Absolute Grading System using the following Letter Grades and corresponding percentage of marks shall be followed:

After each course is evaluated for 100 marks, the marks obtained in each course will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student fall.

Structure of Grading of Academic Performance

Range in which the marks in the subject fall	Grade	Grade points Assigned
90 & above	Superior	10
80 - 89	A (Excellent)	9
70 - 79	B (Very Good)	8
60 - 69	C (Good)	7
50 - 59	D (Average)	6
40 - 49	E (Pass)	5
< 40	F (Fail)	0
Absent	Ab (Absent)	0

i) A student obtaining Grade 'F' or Grade 'Ab' in a subject shall be considered failed and will be required to reappear for that subject when it is offered the next supplementary examination.

ii) For non-credit audit courses, "Satisfactory" or "Unsatisfactory" shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA/Percentage.

Computation of Semester Grade Point Average (SGPA) and Cumulative GradePoint Average (CGPA):

The Semester Grade Point Average (SGPA) is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.,

$$SGPA = \Sigma (C_i \times G_i)/\Sigma C_i$$

where, C_i is the number of credits of the i^{th} subject and G_i is the grade point scored by the student in the i^{th} course.

The Cumulative Grade Point Average (CGPA) will be computed in the same manner considering all the courses undergone by a student over all the semesters of a program, i.e.,

$$CGPA = \Sigma (C_i \times S_i)/ \Sigma C_i$$

where "S_i" is the SGPA of the i^{th} semester and C_i is the total number of credits up to that semester.

Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

While computing the SGPA the subjects in which the student is awarded Zero grade points will also be included.

Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale.
Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by the letters S, A, B, C, D and F.

Award of Class:

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree, he/she shall be placed in one of the following four classes:

Class Awarded	CGPA Secured
First Class with Distinction	≥ 7.5
First Class	≥ 6.5 < 7.5
Second Class	≥ 5.5 < 6.5
Pass Class	≥ 5.0 < 5.5

CGPA to Percentage conversion Formula – (CGPA – 0.5) x 10

20. With–holding of Results

If the candidate has any dues not paid to the university or if any case of indiscipline or malpractice is pending against him/her, the result of the candidate shall be withheld in such cases.

21. Multiple Entry / Exit Option

(a) Exit Policy:

The students can choose to exit the four-year programme at the end of first/second/third year.

i) **UG Certificate in (Field of study/discipline)** - Programme duration: First year (first two semesters) of the undergraduate programme, 40 credits followed by an additional exit 10-credit bridge course(s) lasting two months, including at least 6-credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

ii) **UG Diploma (in Field of study/discipline)** - Programme duration: First two years (first four semesters) of the undergraduate programme, 80 credits followed by an additional exit 10-credit bridge course(s) lasting two months, including at least 6-credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

iii) **Bachelor of Science (in Field of study/discipline)** i.e., **B.Sc. Engineering in (Field of study/discipline)**- Programme duration: First three years (first six semesters) of the undergraduate programme, 120 credits.

(b) Entry Policy:

Modalities on multiple entry by the student into the B.Tech. programme will be provided in due course of time.

Note: The Universities shall resolve any issues that may arise in the implementation of Multiple Entry and Exit policies from time to time and shall review the policies in the light of periodic changes brought by UGC, AICTE and State government.

22. Gap Year Concept:

Gap year concept for Student Entrepreneur in Residence is introduced and outstanding students who wish to pursue entrepreneurship / become entrepreneur are allowed to take a break of one year at any time after II year to pursue full-time entrepreneurship programme/to establish startups. This period may be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation. The principal of the respective college shall forward such proposals submitted by the students to the University. An evaluation committee constituted by the University shall evaluate the proposal submitted by the student and the committee shall decide whether to permit the student(s) to avail the Gap Year or not

23. Transitory Regulations

Discontinued, detained, or failed candidates are eligible for readmission as and when the semester is offered after fulfilment of academic regulations. Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to Section 2 and they will follow the academic regulations into which they are readmitted.

Candidates who are permitted to avail Gap Year shall be eligible for re-joining into the succeeding year of their B. Tech from the date of commencement of class work, subject to Section **2** and they will follow the academic regulations into which they are readmitted.

24. Minimum Instruction Days for a Semester:

The minimum instruction days including exams for each semester shall be 90 days.

25. Medium of Instruction:

The medium of instruction of the entire B. Tech undergraduate programme in Engineering &Technology (including examinations and project reports) will be in English only.

26. Student Transfers:

Student transfers shall be as per the guidelines issued by the Government of Andhra Pradesh and the Universities from time to time.

27. General Instructions:

i. The academic regulations should be read as a whole for purpose of any interpretation.
ii. Malpractices rules-nature and punishments are appended.
iii. Where the words “he”, “him”, “his”, occur in the regulations, they also include “she”, “her”, “hers”, respectively.
iv. The Universities may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on rolls with effect from the dates notified by the Universities.
v. The Universities should train its faculty members time to time to provide experiential education to the students.
vi. The Universities are suggested to form industry consortium for various disciplines of engineering and explore the possibility of including their skilling programs as credit courses.
vii. The Universities should collaborate with Industries/Govt. Institutions in establishing Centers of Excellence (CoEs) in potential areas with exponential growth.
viii. In the case of any doubt or ambiguity in the interpretation of the guidelines given, the decision of the Vice-Chancellor / Head of the institution is final.

ACADEMIC REGULATIONS (R23)
FOR B.TECH. (LATERAL ENTRY SCHEME)

(Effective for the students getting admitted into II year through Lateral Entry Scheme from the Academic Year 2024-2025 onwards)

1. **Award of the Degree**
   (a) Award of the B.Tech. Degree / B.Tech. Degree with a Minor if he/she fulfils the following:
      (i) Pursues a course of study for not less than three academic years and not more than six academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would in addition to the maximum period permitted for graduation (Six years).
      (ii) Registers for 120 credits and secures all 120 credits.

   (b) Award of B.Tech. degree with Honors if he/she fulfils the following:
      (i) Student secures additional 15 credits fulfilling all the requisites of a B.Tech. program i.e., 120 credits.
      (ii) Registering for Honors is optional.
      (iii) Honors is to be completed simultaneously with B.Tech. programme.

2. Students, who fail to fulfil the requirement for the award of the degree within six consecutive academic years from the year of admission, shall forfeit their seat.

3. **Minimum Academic Requirements**
   The following academic requirements have to be satisfied in addition to the requirements mentioned in item no.**2**
   i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the mid semester evaluation and end examination taken together.

   ii. A student shall be promoted from III year to IV year if he/she fulfils the academic requirements of securing 40% of the credits (any decimal fraction should be rounded off to lower digit) in the subjects that have been studied up to V semester.

   And in case if student is already detained for want of credits for particular academic year, the student may make up the credits through supplementary exams of the above exams before the commencement of IV year I semester class work of next year.

4. Course Pattern

i) The entire course of study is three academic years on semester pattern.

ii) A student eligible to appear for the end examination in a subject but absent at it or has failed in the end examination may appear for that subject at the next supplementary examination offered.

iii) When a student is detained due to lack of credits/shortage of attendance the student may be re-admitted when the semester is offered after fulfilment of academic regulations, the student shall be in the academic regulations into which he/she is readmitted.

5. All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme).

PROPOSED COURSE STRUCTURE – B.TECH. - R23

(Applicable from the academic year 2023-24 onwards)

INDUCTION PROGRAMME

S.No.	Course Name	Category	L-T-P-C
1	Physical Activities -- Sports, Yoga and Meditation, Plantation	MC	0-0-6-0
2	Career Counselling	MC	2-0-2-0
3	Orientation to all branches -- career options, tools, etc.	MC	3-0-0-0
4	Orientation on admitted Branch -- corresponding labs, tools and platforms	EC	2-0-3-0
5	Proficiency Modules & Productivity Tools	ES	2-1-2-0
6	Assessment on basic aptitude and mathematical skills	MC	2-0-3-0
7	Remedial Training in Foundation Courses	MC	2-1-2-0
8	Human Values & Professional Ethics	MC	3-0-0-0
9	Communication Skills -- focus on Listening, Speaking, Reading, Writing skills	BS	2-1-2-0
10	Concepts of Programming	ES	2-0-2-0

B.Tech. – I Year I Semester

S.No.	Category	Title	L/D	T	P	Credits
1	BS&H	Communicative English	2	0	0	2
2	BS&H	Engineering Physics	3	0	0	3
3	BS&H	Linear Algebra & Calculus	3	0	0	3
4	Engineering Science	Basic Civil & Mechanical Engineering	3	0	0	3
5	Engineering Science	Introduction to Programming	3	0	0	3
6	BS&H	Communicative English Lab	0	0	2	1
7	BS&H	Engineering Physics Lab	0	0	2	1
8	Engineering Science	Engineering Workshop	0	0	3	1.5
9	Engineering Science	Computer Programming Lab	0	0	3	1.5
10	BS&H	Health and wellness, Yoga and sports	-	-	1	0.5
Total			**14**	**00**	**11**	**19.5**

B.Tech. – I Year II Semester

S.No.	Category	Title	L/D	T	P	Credits
1	BS&H	Chemistry	3	0	0	3
2	BS & H	Differential Equations & Vector Calculus	3	0	0	3
3	Engineering Science	Basic Electrical and Electronics Engineering	3	0	0	3
4	Engineering Science	Engineering Graphics	1	0	4	3
5	Engineering Science	IT Workshop	0	0	2	1
6	Professional Core	Program core (Branch specific)	3	0	0	3
7	BS&H	Chemistry Lab	0	0	2	1
8	Engineering Science	Electrical and Electronics Engineering Workshop	0	0	3	1.5
9	Professional Core	Program Core Lab (Branch specific)	0	0	3	1.5
10	BS&H	NSS/NCC/Scouts & Guides/Community Service	-	-	1	0.5
Total			**13**	**0**	**15**	**20.5**

B.Tech. – II Year I Semester

S.No.	Category	Title	L	T	P	Credits
1	BS&H	Engineering Mathematics (Branch specific)	3	0	0	3
2	BS&H	Universal Human Values – Understanding Harmony	2	1	0	3
3	Engineering Science		2	0	0	2
4	Professional Core		3	0	0	3
5	Professional Core		3	0	0	3
6	Engineering Science		0	0	2	1
7	Professional Core		0	0	3	1.5
8	Professional Core		0	0	3	1.5
9	Skill Enhancement course		0	1	2	2
10	Audit Course	Environmental Science	2	0	0	-
Total			**15**	**2**	**10**	**20**

B.Tech. – II Year II Semester

S.No.	Category	Title	L	T	P	Credits
1	Management Course - I		2	0	0	2
2	Engineering Science		3	0	0	3
3	Professional Core		3	0	0	3
4	Professional Core		3	0	0	3
5	Professional Core		3	0	0	3
6	Professional Core		0	0	2	1
7	Professional Core		0	0	3	1.5
8	Professional Core		0	0	3	1.5
9	Skill Enhancement course		0	1	2	2
10	BS&H	Design Thinking & Innovation	1	0	2	2
Total			**15**	**1**	**12**	**22**
Mandatory Community Service Project Internship of 08 weeks duration during summer vacation						

B.Tech. – III Year I Semester

S.No.	Category	Title	L	T	P	Credits
1	Professional Core		3	0	0	3
2	Professional Core		3	0	0	3
3	Professional Elective - I		2	0	0	2
4	Open Elective - I		3	0	0	3
5	Open Elective - II		3	0	0	3
6	Professional Core		0	0	3	1.5
7	Professional Core		0	0	3	1.5
8	Skill Enhancement course		0	1	2	2
9	BS&H	Tinkering Lab	0	0	2	1
10	Evaluation of Community Service Internship		-	-	-	2
Total			14	1	10	22

B.Tech. – III Year II Semester

S.No.	Category	Title	L	T	P	Credits
1	Professional Core		3	0	0	3
2	Professional Core		3	0	0	3
3	Professional Core		3	0	0	3
4	Professional Elective - II		3	0	0	3
5	Professional Elective - III		2	0	0	2
6	Open Elective - III		3	0	0	3
7	Professional Core		0	0	2	1
8	Professional Core		0	0	2	1
9	Skill Enhancement course		0	1	2	2
10	Audit Course	Technical Paper Writing & IPR	2	0	0	-
Total			**19**	**1**	**06**	**21**
Mandatory Industry Internship of 08 weeks duration during summer vacation						

B.Tech. – IV Year I Semester

S.No.	Category	Title	L	T	P	Credits
1	Professional Core		3	0	0	3
2	Professional Core		3	0	0	3
3	Management Course - II		2	0	0	2
4	Professional Elective - IV		3	0	0	3
5	Professional Elective - V		3	0	0	3
6	Open Elective - IV		3	0	0	3
7	Professional Core		0	0	2	1
8	Professional Core		0	0	2	1
9	Skill Enhancement Course		0	1	2	2
10	Audit Course	Constitution of India	2	0	0	-
11	Internship	Evaluation of Industry Internship	-	-	-	2
		Total	**19**	**1**	**06**	**23**

B.Tech. – IV Year II Semester

S.No.	Category	Title	L	T	P	Credits
1	Internship & Project Work	Full semester Internship & Project Work	0	0	24	12

FIRST YEAR SYLLABUS

L	T	P	C
2	0	0	2

COMMUNICATIVE ENGLISH

(Common to All Branches of Engineering)

Course Objectives:

The main objective of introducing this course, *Communicative English*, is to facilitate effective listening, Reading, Speaking and Writing skills among the students. It enhances the same in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary. This course helps the students to make them effective in speaking and writing skills and to make them industry ready.

Course Outcomes:

CO1: Understand the context, topic, and pieces of specific information from social or Transactional dialogues.
CO2: Apply grammatical structures to formulate sentences and correct word forms.
CO3: Analyze discourse markers to speak clearly on a specific topic in informal discussions.
CO4: Evaluate reading / listening texts and to write summaries based on global comprehension of these texts.
CO5: Create a coherent paragraph, essay, and resume.

UNIT I

Lesson: HUMAN VALUES: Gift of Magi **(Short Story)**

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.
Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.
Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information.
Writing: Mechanics of Writing-Capitalization, Spellings, Punctuation-Parts of Sentences.
Grammar: Parts of Speech, Basic Sentence Structures-forming questions
Vocabulary: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

UNIT II

Lesson: NATURE: The Brook by Alfred Tennyson (Poem)

Listening: Answering a series of questions about main ideas and supporting ideas after listening to audio texts.
Speaking: Discussion in pairs/small groups on specific topics followed by short structure talks.
Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Structure of a paragraph - Paragraph writing (specific topics)
Grammar: Cohesive devices - linkers, use of articles and zero article; prepositions.
Vocabulary: Homonyms, Homophones, Homographs.

UNIT III
Lesson: BIOGRAPHY: Elon Musk

Listening: Listening for global comprehension and summarizing what is listened to.
Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed
Reading: Readinga text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.
Writing: Summarizing, Note-making, paraphrasing
Grammar: Verbs - tenses; subject-verb agreement; Compound words, Collocations
Vocabulary: Compound words, Collocations

UNIT IV

Lesson: INSPIRATION: The Toys of Peace by Saki

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.
Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.
Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data.
Writing: Letter Writing: Official Letters, Resumes
Grammar: Reporting verbs, Direct & Indirect speech, Active & Passive Voice
Vocabulary: Words often confused, Jargons

UNIT V
Lesson: MOTIVATION: The Power of Intrapersonal Communication (An Essay)

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.
Speaking: Formal oral presentations on topics from academic contexts
Reading: Reading comprehension.
Writing: Writing structured essays on specific topics.
Grammar: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)
Vocabulary: Technical Jargons

Textbooks:

1. Pathfinder: Communicative English for Undergraduate Students, 1st Edition, Orient Black Swan, 2023 (Units 1,2 & 3)

2. Empowering with Language by Cengage Publications, 2023 (Units 4 & 5)

Reference Books:

1. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020
2. Bailey, Stephen. Academic writing: A Handbook for International Students. Routledge, 2014.
3. Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge University Press, 2019.
4. Lewis, Norman. Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary. Anchor, 2014.

Web Resources:

GRAMMAR:

1. www.bbc.co.uk/learningenglish
2. https://dictionary.cambridge.org/grammar/british-grammar/
3. www.eslpod.com/index.html
4. https://www.learngrammar.net/
5. https://english4today.com/english-grammar-online-with-quizzes/
6. https://www.talkenglish.com/grammar/grammar.aspx

VOCABULARY

1. https://www.youtube.com/c/DailyVideoVocabulary/videos
2. https://www.youtube.com/channel/UC4cmBAit8i_NJZE8qK8sfpA

L	T	P	C
0	0	2	1

COMMUNICATIVE ENGLISH LAB

(Common to All Branches of Engineering)

Course Objectives:

The main objective of introducing this course, Communicative English Laboratory, is to expose the students to a variety of self-instructional, learner friendly modes of language learning. The students will get trained in basic communication skills and also make them ready to face job interviews.

Course Outcomes:

CO1: Understand the different aspects of the English language proficiency with emphasis on LSRW skills.
CO2: Apply communication skills through various language learning activities.
CO3: Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
CO4: Evaluate and exhibit professionalism in participating in debates and group discussions.
CO5: Create effective Course Objectives:

List of Topics:

1. Vowels & Consonants
2. Neutralization/Accent Rules
3. Communication Skills & JAM
4. Role Play or Conversational Practice
5. E-mail Writing
6. Resume Writing, Cover letter, SOP
7. Group Discussions-methods & practice
8. Debates - Methods & Practice
9. PPT Presentations/ Poster Presentation
10. Interviews Skills

Suggested Software:

- Walden Infotech
- Young India Films

Reference Books:

1. Raman Meenakshi, Sangeeta-Sharma. *Technical Communication*. Oxford Press.2018.
2. Taylor Grant: *English Conversation Practice*, Tata McGraw-Hill Education India, 2016
3. Hewing's, Martin. Cambridge *Academic English* (B2). CUP, 2012.
4. J. Sethi & P.V. Dhamija. *A Course in Phonetics and Spoken English*, (2nd Ed), Kindle, 2013

Web Resources:

Spoken English:

1. www.esl-lab.com
2. www.englishmedialab.com
3. www.englishinteractive.net
4. https://www.britishcouncil.in/english/online
5. http://www.letstalkpodcast.com/
6. https://www.youtube.com/c/mmmEnglish_Emma/featured
7. https://www.youtube.com/c/ArnelsEverydayEnglish/featured
8. https://www.youtube.com/c/engvidAdam/featured
9. https://www.youtube.com/c/EnglishClass101/featured
10. https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists
11. https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

Voice & Accent:

1. https://www.youtube.com/user/letstalkaccent/videos
2. https://www.youtube.com/c/EngLanguageClub/featured
3. https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc
4. https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

L	T	P	C
3	0	0	3

LINEAR ALGEBRA & CALCULUS

(Common to All Branches of Engineering)

Course Objectives:

- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real-world problems and their applications.

Course Outcomes: At the end of the course, the student will be able to

CO1: Develop and use of matrix algebra techniques that are needed by engineers for practical applications.

CO2: Utilize mean value theorems to real life problems.

CO3: Familiarize with functions of several variables which is useful in optimization.

CO4: Learn important tools of calculus in higher dimensions.

CO5: Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.

UNIT I Matrices

Rank of a matrix by echelon form, normal form. Cauchy–Binet formulae (without proof). Inverse of Non- singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Jacobi and Gauss Seidel Iteration Methods.

UNIT II Eigenvalues, Eigenvectors and Orthogonal Transformation

Eigenvalues, Eigenvectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT III Calculus

Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem with their geometrical interpretation, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), Problems and applications on the above theorems.

UNIT IV Partial differentiation and Applications (Multi variable calculus)

Functions of several variables: Continuity and Differentiability, Partial derivatives, total derivatives, chain rule, Directional derivative, Taylor's and Maclaurin's series expansion of functions of two variables. Jacobians, Functional dependence, maxima and minima of functions of two variables, method of Lagrange multipliers.

UNIT V Multiple Integrals (Multi variable Calculus)

Double integrals, triple integrals, change of order of integration, change of variables to polar, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).

Textbooks:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.

Reference Books:

1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha ScienceInternational Ltd., 2021 5th Edition(9th reprint).
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition.
4. Advanced Engineering Mathematics, Micheael Greenberg, , Pearson publishers, 9th edition
5. Higher Engineering Mathematics, H. K Das, Er. Rajnish Verma, S. Chand Publications,2014, Third Edition (Reprint 2021)

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DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

(Common to All Branches of Engineering)

Course Objectives:

- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real-world applications.

Course Outcomes: At the end of the course, the student will be able to

CO1: Solve the differential equations related to various engineering fields.
CO2: Identify solution methods for partial differential equations that model physical processes.
CO3: Interpret the physical meaning of different operators such as gradient, curl and divergence.
CO4: Estimate the work done against a field, circulation and flux using vector calculus.

UNIT I Differential equations of first order and first degree

Linear differential equations – Bernoulli's equations- Exact equations and equations reducible to exact form. Applications: Newton's Law of cooling – Law of natural growth and decay- Electrical circuits.

UNIT II Linear differential equations of higher order (Constant Coefficients)

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskian, Method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Simple Harmonic motion.

UNIT III Partial Differential Equations

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equations using Lagrange's method. Homogeneous Linear Partial differential equations with constant coefficients.

UNIT IV Vector differentiation

Scalar and vector point functions, vector operator Del, Del applies to scalar point functions-Gradient, Directional derivative, del applied to vector point functions-Divergence and Curl, vector identities.

UNIT V Vector integration

LWithoutegral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and related problems.

Textbooks:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.

Reference Books:

1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, Dennis G. Zill and Warren S. Wright, Jones and Bartlett, 2018.
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition.
4. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha Science International Ltd., 2021 5th Edition (9th reprint).
5. Higher Engineering Mathematics, B. V. Ramana, , McGraw Hill Education, 2017

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ENGINEERING PHYSICS

(Common for all branches of Engineering)

Course Objectives:

To bridge the gap between the Physics in school at 10+2 level and UG level engineering courses by identifying the importance of the optical phenomenon like interference, diffraction etc, enlightening the periodic arrangement of atoms in crystalline solids and concepts of quantum mechanics, introduce novel concepts of dielectric and magnetic materials, physics of semiconductors.

Course Outcomes:

CO1: Analyze the intensity variation of light due to polarization, interference and diffraction.
CO2: Familiarize with the basics of crystals and their structures.
CO3: Explain fundamentals of quantum mechanics and apply it to one dimensional motion of particles.
CO4: Summarize various types of polarization of dielectrics and classify the magnetic materials.
CO5: Explain the basic concepts of Quantum Mechanics and the band theory of solids.
CO6: Identify the type of semiconductor using Hall effect.

UNIT I Wave Optics

Interference: Introduction - Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colours in thin films- Newton's Rings, Determination of wavelength and refractive index.
Diffraction: Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit & N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating (Qualitative). Polarization: Introduction -Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol's Prism -Half wave and Quarter wave plates.

UNIT II Crystallography and X-ray diffraction

Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices – crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC - Miller indices – separation between successive (hkl) planes.

X-ray diffraction: Bragg's law - X-ray Diffractometer – crystal structure determination by Laue's and powder methods

UNIT III Dielectric and Magnetic Materials

Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector – Relation between the electric vectors - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation

polarizations (Qualitative) - Lorentz internal field - Clausius- Mossotti equation - complex dielectric constant – Frequency dependence of polarization – dielectric loss

Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability – Atomic origin of magnetism - Classification of magnetic materials: Dia, para, Ferro, anti-ferro & Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials.

UNIT IV Quantum Mechanics and Free electron Theory

Quantum Mechanics: Dual nature of matter – Heisenberg's Uncertainty Principle – Significance and properties of wave function – Schrodinger's time independent and dependent wave equations– Particle in a one-dimensional infinite potential well.

Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits) – Quantum free electron theory – electrical conductivity based on quantum free electron theory - Fermi-Dirac distribution - Density of states - Fermi energy

UNIT V Semiconductors

Semiconductors: Formation of energy bands – classification of crystalline solids - Intrinsic semiconductors: Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors: density of charge carriers – dependence of Fermi energy on carrier concentration and temperature - Drift and diffusion currents – Einstein's equation – Hall effect and its applications.

Textbooks:

1. A Text book of Engineering Physics, M. N. Avadhanulu, P.G.Kshirsagar & TVS Arun Murthy, S. Chand Publications, 11th Edition 2019.
2. Engineering Physics - D.K.Bhattacharya and Poonam Tandon, Oxford press (2015)

Reference Books:

1. Engineering Physics - B.K. Pandey and S. Chaturvedi, Cengage Learning 2021.
2. Engineering Physics - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
3. Engineering Physics" - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press. 2010
4. Engineering Physics - M.R. Srinivasan, New Age international publishers (2009).

Web Resources: https://www.loc.gov/rr/scitech/selected-internet/physics.html

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ENGINEERING PHYSICS LAB

(Common to All Branches of Engineering)

Course Objectives:

To study the concepts of optical phenomenon like interference, diffraction etc., recognize the importance of energy gap in the study of conductivity and Hall effect in semiconductors and study the parameters and applications of dielectric and magnetic materials by conducting experiments.

Course Outcomes: The students will be able to
CO1: Operate optical instruments like travelling microscope and spectrometer.
CO2: Estimate the wavelengths of different colours using diffraction grating.
CO3: Plot the intensity of the magnetic field of circular coil carrying current with distance.
CO4: Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.
CO5: Calculate the band gap of a given semiconductor.
CO6: Identify the type of semiconductor using Hall effect.

List of Experiments:

1. Determination of radius of curvature of a given Plano-convex lens by Newton's rings.
2. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Verification of Brewster's law
4. Determination of dielectric constant using charging and discharging method.
5. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
6. Determination of wavelength of Laser light using diffraction grating.
7. Estimation of Planck's constant using photoelectric effect.
8. Determination of the resistivity of semiconductors by four probe methods.
9. Determination of energy gap of a semiconductor using p-n junction diode.
10. Magnetic field along the axis of a current carrying circular coil by Stewart Gee's Method.
11. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
12. Determination of temperature coefficients of a thermistor.
13. Determination of acceleration due to gravity and radius of Gyration by using a compound pendulum.
14. Determination of magnetic susceptibility by Kundt's tube method.
15. Determination of rigidity modulus of the material of the given wire using Torsional pendulum.
16. Sonometer: Verification of laws of stretched string.
17. Determination of young's modulus for the given material of wooden scale by non-uniform bending (or double cantilever) method.
18. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.

Note: Any TEN of the listed experiments are to be conducted. Out of which any TWO experiments may be conducted in virtual mode.

References:

- A Textbook of Practical Physics - S. Balasubramanian, M.N. Srinivasan, S. Chand Publishers, 2017.

Web Resources

- www.vlab.co.in
- https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype

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ENGINEERING CHEMISTRY

(Common to Civil, Chemical, Mechanical Engineering and allied branches)

Course Objectives:

- To familiarize engineering chemistry and its applications
- To impart the concept of soft and hard waters, softening methods of hard water
- To train the students on the principles and applications of ectrochemistry, polymers, surface chemistry, and cement

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Course Outcomes: At the end of the course, the students will be able to

CO1: Demonstrate the corrosion prevention methods and factors affecting corrosion.

CO2: Explain the preparation, properties, and applications of thermoplastics & thermosetting, elastomers & conducting polymers.

CO3: Explain calorific values, octane number, refining of petroleum and cracking of oils.

CO4: Explain the setting and hardening of cement.

CO5: Summarize the concepts of colloids, micelle and nanomaterials.

UNIT I Water Technology

Soft and hardwater, Estimation of hardness of water by EDTA Method, Estimation of dissolved Oxygen - Boiler troubles –Priming, foaming**,** scale and sludge, Caustic embrittlement, Industrial water treatment – Specifications for drinking water, Bureau of Indian Standards(BIS) and World health organization(WHO) standards, Ion-exchange processes - desalination of brackish water, reverse osmosis (RO) and electrodialysis.

UNIT II Electrochemistry and Applications

Electrodes –electrochemical cell, Nernst equation, cell potential calculations.

Primary cells – Zinc-air battery, Secondary cells – Nickel-Cadmium (NiCad),and lithium ion batteries- working principle of the batteries including cell reactions; Fuel cells-Basic Concepts, the principle and working of hydrogen-oxygen Fuel cell.

Corrosion: Introduction to corrosion, electrochemical theory of corrosion, differential aeration cell corrosion, galvanic corrosion, metal oxide formation by dry electrochemical corrosion, Pilling Bedworth ratios and uses, Factors affecting the corrosion**,** cathodic and anodic protection, electroplating and electro less plating (Nickel and Copper).

UNIT III Polymers and Fuel Chemistry

Introduction to polymers, functionality of monomers, Mechanism of chain growth, step growth polymerization.

Thermoplastics and Thermo-setting plastics-: Preparation, properties and applications of poly styrene. PVC Nylon 6,6 and Bakelite.

Elastomers – Preparation, properties and applications of Buna S, Buna N, Thiokol rubbers.

Fuels – Types of fuels, calorific value of fuels, numerical problems based on calorific value; Analysis of coal (Proximate and Ultimate analysis), Liquid Fuels, refining of petroleum, Octane and Cetane number- alternative fuels- propane, methanol, ethanol and bio fuel-bio diesel.

UNIT IV Modern Engineering Materials

Composites- Definition, Constituents, Classification- Particle, Fibre and Structural reinforced composites, properties and Engineering applications
Refractories- Classification, Properties, Factors affecting the refractory materials and Applications.
Lubricants- Classification, Functions of lubricants, Mechanism, Properties of lubricating oils – Viscosity, Viscosity Index, Flash point, Fire point, Cloud point, saponification and Applications.
Building materials- Portland Cement, constituents, Setting and Hardening of cement.

UNIT V Surface Chemistry and Nanomaterials

Introduction to surface chemistry, colloids, nanometals and nanometal oxides, micelle formation, synthesis of colloids (Braggs Method), chemical and biological methods of preparation of nanometals and metal oxides, stabilization of colloids and nanomaterials by stabilizing agents, adsorption isotherm (Freundlich and Longmuir), BET equation (no derivation) applications of colloids and nanomaterials – catalysis, medicine, sensors, etc.

Textbooks:

1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference Books:

1. H.F.W. Taylor, Cement Chemistry, 2/e, Thomas Telford Publications, 1997.
2. D.J. Shaw, Introduction to Colloids and Surface Chemistry, Butterworth-Heineman, 1992.
3. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition

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ENGINEERING CHEMISTRY LAB

(Common to Civil, Chemical, Mechanical Engineering & allied branches)

Course Objectives:

- To verify the fundamental concepts with experiments

Course Outcomes: At the end of the course, the students will be able to

CO1: Determine the cell constant and conductance of solutions.
CO2: Prepare advanced polymer materials.
CO3: Determine the physical properties like surface tension, adsorption and viscosity.
CO4: Estimate the Iron and Calcium in cement.
CO5: Calculate the hardness of water.

List of Experiments:

1. Determination of Hardness of a groundwater sample.
2. Estimation of Dissolved Oxygen by Winkler's method
3. Determination of Strength of an acid in Pb-Acid battery
4. Preparation of a polymer (Bakelite)
5. Determination of percentage of Iron in Cement sample by colorimetry
6. Estimation of Calcium in port land Cement
7. Preparation of nanomaterials by precipitation method.
8. Adsorption of acetic acid by charcoal
9. Determination of percentage Moisture content in a coal sample
10. Determination of Viscosity of lubricating oil by Redwood Viscometer 1
11. Determination of Viscosity of lubricating oil by Redwood Viscometer 2
12. Determination of Calorific value of gases by Junker's gas Calorimeter

Reference:

- "Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson Publications by J. Mendham, R.C. Denney, J.D. Barnes and B. Sivasankar

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CHEMISTRY

(Common to EEE, ECE, CSE, IT) & allied branches)

C**ourse Objectives:**

- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers
- To introduce instrumental methods, molecular machines and switches.

Course Outcomes: At the end of the course, the students will be able to:
CO1: Compare the materials of construction for battery and electrochemical sensors.
CO2: Explain the preparation, properties, and applications of thermoplastics & thermosetting & elastomers conducting polymers.
CO3: Explain the principles of spectrometry, slc in separation of solid and liquid mixtures.
CO4: Apply the principle of Band diagrams in the application of conductors and semiconductors.
CO5: Summarize the concepts of Instrumental methods.

UNIT I Structure and Bonding Models:

Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ^2, particle in one dimensional box, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules – energy level diagrams of O2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order.

UNIT II Modern Engineering materials

Semiconductors – Introduction, basic concept, application

Super conductors-Introduction basic concept, applications.

Supercapacitors: Introduction, Basic Concept-Classification – Applications.

Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphines nanoparticles.

UNIT III Electrochemistry and Applications

Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).

Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.

Primary cells – Zinc-air battery, Secondary cells –lithium-ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygenfuel cell– working of the cells. Polymer Electrolyte Membrane Fuel cells (PEMFC).

UNIT IV Polymer Chemistry

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of polymer formation.

Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres.

Elastomers–Buna-S, Buna-N–preparation, properties and applications.

Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications. Bio-Degradable polymers - Poly Glycolic Acid (PGA), Polyl Lactic Acid (PLA).

UNIT V Instrumental Methods and Applications

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, electronic transition, Instrumentation, IR spectroscopies, fundamental modes and selection rules, Instrumentation. Chromatography-Basic Principle, Classification-HPLC: Principle, Instrumentation and Applications.

Textbooks:

1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference Books:

1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
2. J.D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.2008
3. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition

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CHEMISTRY LAB

(Common to EEE, ECE, CSE, IT & allied branches)

Course Objectives:

- Verify the fundamental concepts with experiments.

Course Outcomes: At the end of the course, the students will be able to

CO1: Determine the cell constant and conductance of solutions.
CO2: Prepare advanced polymer Bakelite materials.
CO3: Measure the strength of an acid present in secondary batteries.
CO4: Analyse the IR spectra of some organic compounds.
CO5: Calculate strength of acid in Pb-Acid battery.

List of Experiments:

1. Measurement of 10Dq by spectrophotometric method
2. Conductometric titration of strong acid vs. strong base
3. Conductometric titration of weak acid vs. strong base
4. Determination of cell constant and conductance of solutions
5. Potentiometry - determination of redox potentials and emfs
6. Determination of Strength of an acid in Pb-Acid battery
7. Preparation of a Bakelite
8. Verify Lambert-Beer’s law
9. Wavelength measurement of sample through UV-Visible Spectroscopy
10. Identification of simple organic compounds by IR
11. Preparation of nanomaterials by precipitation method
12. Estimation of Ferrous Iron by Dichrometry

Reference:

- "Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson Publications by J. Mendham, R.C.Denney, J.D.Barnes and B. Sivasankar

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FUNDAMENTAL CHEMISTRY

(Food Technology & allied branches)

Course Objectives:

- To familiarize engineering chemistry and its applications.
- To train the students on the principles and applications of electrochemistry and polymers.
- To introduce instrumental methods, molecular machines and switches.

Course Outcomes: At the end of the course, the students will be able to

CO1: Compare the materials of construction for battery and electrochemical sensors.
CO2: Explain the preparation, properties, and applications of thermoplastics &thermosetting, elastomers & conducting polymers.
CO3: Distinguish the principles of spectrometry, solid liquid chromatography in separationof solids and liquid mixtures.
CO4: Apply the principle of Beer Lambert's Law.
CO5: Illustrate conductometric and pH metric titrations.

UNIT I Structure and Bonding Models

Planck's quantum theory, dual nature of matter, Schrodinger wave equation, significance of Ψ and Ψ^2, applications to hydrogen, Molecular Orbital Theory – bonding in homo- and heteronuclear diatomic molecules – Energy level diagrams of O2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order.

UNIT II Electrochemistry and Applications

Electrodes –reference electrodes (Calomel electrode, and glass electrode) electrochemical cell, Nernst equation, numerical problems based on cell potential calculations, pH meter and applications of pH metry (acid-base titrations), conductivity, conductivity cell, conductometric titrations (acid-base titrations).

Electrochemical sensors – potentiometric sensors with example.

Primary cells – Zinc-air battery, Secondary cells – Nickel-Cadmium and lithium ion batteries-working principle of the batteries including cell reactions; Fuel cells- hydrogen-oxygen fuel cells – basic principle, working, and applications.

UNIT III Polymer Chemistry

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, with specific examples and mechanisms of polymer formation.

Plastics - Thermoplastics and Thermo settings, Preparation, properties and applications of – PVC, Bakelite, Nylon-6,6, carbon fibres. Elastomers–Buna-S, Buna-N–preparation, properties and applications.

Bio degradable polymers: Poly β-hydroxybutyrate-co-β-hydroxyvalerate (PHBV), poly hydroxyl butyrate (PHB) and applications.

UNIT IV Instrumental Methods and Applications

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, electronic transition, Instrumentation, IR spectroscopies, fundamental modes and selection rules, Instrumentation. Chromatography: Basic Principle-Classification of Chromatography-HPLC-principle, Instrumentation, Thin Layer Chromatography (TLC) and applications

UNIT V Surface Chemistry and Nano Materials

Introduction to surface chemistry, colloids, nanometals and nanometal oxides, micelle formation, synthesis of colloids (Braggs Method), chemical and biological methods of preparation of nanometals and metal oxides, stabilization of colloids and nanomaterials by stabilizing agents, adsorption isotherm (Freundlich and Longmuir), BET equation (no derivation) applications of colloids and nanomaterials – catalysis, medicine, sensors, etc.

Textbooks:

1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference Books:

1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
2. D.J. Shaw, Introduction to Colloids and Surface Chemistry, Butterworth-Heineman, 1992.
3. J.D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.2008

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FUNDAMENTAL CHEMISTRY LAB

(Food Technology & allied branches)

Course Objectives:

- Verify the fundamental concepts with the following experiments.

Course Outcomes: At the end of the course, the students will be able to

CO1: Determine the cell constant and conductance of solutions.
CO2: Prepare advanced polymer materials.
CO3: Measure the strength of an acid present in secondary batteries.
CO4: Analyze the IR spectra of some organic compounds.
CO5: Compare conductometric and pH metric titrations.

List of Experiments:

1. Measurement of 10Dq by spectrophotometric method
2. pH metric titration of strong acid vs strong base,
3. pH metric titration of weak acid vs strong base
4. Conductometric titration of weak acid vs strong base
5. Determination of cell constant and conductance of solutions
6. Determination of Strength of an acid in Pb-Acid battery
7. Preparation of Bakelite.
8. Determination of viscosity of polymer solution using viscometer
9. Verify Lambert-Beer’s law
10. Separation of Organic Mixtures by Thin Layer Chromatography.
11. Identification of simple organic compounds by IR
12. Preparation of nanomaterials by precipitation method.
13. Adsorption of acetic acid by charcoal

Reference:

- "Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson Publications by J. Mendham, R.C. Denney, J.D. Barnes and B. Sivasankar

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BASIC CIVIL AND MECHANICAL ENGINEERING

(Common to All branches of Engineering)

Course Objectives:

- Get familiarized with the scope and importance of Civil Engineering sub-divisions.
- Introduce the preliminary concepts of surveying.
- Acquire preliminary knowledge on Transportation and its importance in nation's economy.
- Get familiarized with the importance of quality, conveyance and storage of water.
- Introduction to basic civil engineering materials and construction techniques.

Course Outcomes: On completion of the course, the student should be able to:

CO1: Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society.

CO2: Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.

CO3: Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.

CO4: Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated.

CO5: Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.

UNIT I

Basics of Civil Engineering: Role of Civil Engineers in Society- Various Disciplines of Civil Engineering- Structural Engineering- Geo-technical Engineering- Transportation Engineering - Hydraulics and Water Resources Engineering - Environmental Engineering-Scope of each discipline - Building Construction and Planning- Construction Materials-Cement - Aggregate - Bricks- Cement concrete- Steel. Introduction to Prefabricated construction Techniques.

UNIT II

Surveying: Objectives of Surveying- Horizontal Measurements- Angular Measurements- Introduction to Bearings Levelling instruments used for levelling -Simple problems on levelling and bearings-Contour mapping.

UNIT III

Transportation Engineering Importance of Transportation in Nation's economic development- Types of Highway Pavements- Flexible Pavements and Rigid Pavements - Simple Differences. Basics of Harbour, Tunnel, Airport, and Railway Engineering.

Water Resources and Environmental Engineering: Introduction, Sources of water- Quality of water- Specifications- Introduction to Hydrology–Rainwater Harvesting-Water Storage and Conveyance Structures (Simple introduction to Dams and Reservoirs).

Textbooks:

1. Basic Civil Engineering, M.S.Palanisamy, , Tata Mcgraw Hill publications (India) Pvt. Ltd. Fourth Edition.
2. Introduction to Civil Engineering, S.S. Bhavikatti, New Age International Publishers. 2022. First Edition.
3. Basic Civil Engineering, Satheesh Gopi, Pearson Publications, 2009, First Edition.

Reference Books:

1. Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers 2019. Fifth Edition.
2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi. 2016
3. Irrigation Engineering and Hydraulic Structures - Santosh Kumar Garg, Khanna Publishers, Delhi 2023. 38th Edition.
4. Highway Engineering, S.K.Khanna, C.E.G. Justo and Veeraraghavan, Nemchand and Brothers Publications 2019. 10th Edition.
5. Indian Standard DRINKING WATER — SPECIFICATION IS 10500-2012.

PART B: BASIC MECHANICAL ENGINEERING

Course Objectives: The students after completing the course are expected to

- Get familiarized with the scope and importance of Mechanical Engineering in different sectors and industries.
- Explain different engineering materials and different manufacturing processes.
- Provide an overview of different thermal and mechanical transmission systems and introduce basics of robotics and its applications.

Course Outcomes: On completion of the course, the student should be able to

CO1: Understand the different manufacturing processes.
CO2: Explain the basics of thermal engineering and its applications.
CO3: Describe the working of different mechanical power transmission systems and power plants.
CO4: Describe the basics of robotics and its applications.

UNIT I

Introduction to Mechanical Engineering: Role of Mechanical Engineering in Industries and Society- Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.
Engineering Materials - Metals-Ferrous and Non-ferrous, Ceramics, Composites, Smart materials.

UNIT II

Manufacturing Processes: Principles of Casting**,** Forming, joining processes, Machining, Introduction to CNC machines, 3D printing, and Smart manufacturing.

Thermal Engineering – working principle of Boilers, Otto cycle, Diesel cycle, Refrigeration and air-conditioning cycles, IC engines, 2-Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric and Hybrid Vehicles.

UNIT III

Power plants – working principle of Steam, Diesel, Hydro, Nuclear power plants.
Mechanical Power Transmission - Belt Drives, Chain, Rope drives, Gear Drives and their applications.
Introduction to Robotics - Joints & links, configurations, and applications of robotics.

(Note: The subject covers only the basic principles of Civil and Mechanical Engineering systems. The evaluation shall be intended to test only the fundamentals of the subject)

Textbooks:

1. Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications (India) Pvt. Ltd.
2. A Tear book of Theory of Machines by S.S. Rattan, Tata McGraw Hill Publications, (India) Pvt. Ltd.
3. An introduction to Mechanical Engg by Jonathan Wicker and Kemper Lewis, Cengage learning India Pvt. Ltd.

Reference Books:

1. Appuu Kuttan KK, Robotics, I.K. International Publishing House Pvt. Ltd. Volume-I
2. 3D printing & Additive Manufacturing Technology- L. Jyothish Kumar, Pulak M Pandey, Springer publications
3. Thermal Engineering by Mahesh M Rathore Tata McGraw Hill publications (India) Pvt. Ltd.
4. G. Shanmugam and M.S.Palanisamy, Basic Civil and the Mechanical Engineering, Tata McGraw Hill publications (India) Pvt. Ltd.

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ENGINEERING WORKSHOP

(Common to All branches of Engineering)

Course Objectives:

To familiarize students with wood working, sheet metal operations, fitting and electrical house wiring skills

Course Outcomes:

CO1: Identify workshop tools and their operational capabilities.
CO2: Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding.
CO3: Apply fitting operations in various applications.
CO4: Apply basic electrical engineering knowledge for House Wiring Practice

SYLLABUS

1. **Demonstration**: Safety practices and precautions to be observed in workshop.
2. **Wood Working:** Familiarity with different types of woods and tools used in wood working and make following joints.
   a) Half – Lap joint b) Mortise and Tenon joint c) Corner Dovetail joint or Bridle joint
3. **Sheet Metal Working**: Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets.
   a) Tapered tray b) Conical funnel c) Elbow pipe d) Brazing
4. **Fitting:** Familiarity with different types of tools used in fitting and do the following fitting exercises.
   a) V-fit b) Dovetail fit c) Semi-circular fit d) Bicycle tire puncture and change of two-wheeler tyre
5. **Electrical Wiring**: Familiarity with different types of basic electrical circuits and make the following connections.
   a) Parallel and series b) Two-way switch c) Godown lighting
   d) Tube light e) Three phase motor f) Soldering of wires
6. **Foundry Trade:** Demonstration and practice on Moulding tools and processes, Preparation of Green Sand Moulds for given Patterns.
7. **Welding Shop**: Demonstration and practice on Arc Welding and Gas welding. Preparation of Lap joint and Butt joint.
8. **Plumbing:** Demonstration and practice of Plumbing tools, Preparation of Pipe joints with coupling for same diameter and with reducer for different diameters.

Textbooks:

1. Basic Workshop Technology: Manufacturing Process, Felix W.; Independently Published,2019. Workshop Processes, Practices and Materials; Bruce J. Black, Routledge publishers, 5th Edn. 2015.
2. A Course in Workshop Technology Vol I. & II, B.S. Raghuwanshi, Dhanpath Rai & Co., 2015 & 2017.

Reference Books:

1. Elements of Workshop Technology, Vol. I by S. K. Hajra Choudhury & Others, Media Promoters and Publishers, Mumbai. 2007, 14th edition
2. Workshop Practice by H. S. Bawa, Tata-McGraw Hill, 2004.
3. Wiring Estimating, Costing and Contracting; Soni P.M. & Upadhyay P.A.; Atul Prakashan, 2021-22.

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BASIC ELECTRICAL & ELECTRONICS ENGINEERING

(Common to All branches of Engineering)

Course Objectives

To expose to the field of electrical & electronics engineering, laws and principles of electrical/ electronic engineering and to acquire fundamental knowledge in the relevant field.

Course Outcomes: After the completion of the course students will be able to

Course Outcomes:

CO1: Remember the fundamental laws, operating principles of motors, generators, MC and MI instruments.

CO2: Understand the problem solving concepts associated to AC and DC circuits, construction and operation of AC and DC machines, measuring instruments; different power generation mechanisms, Electricity billing concept and important safety measures related to electrical operations.

CO3: Apply mathematical tools and fundamental concepts to derive various equations related to machines, circuits and measuring instruments; electricity bill calculations and layout representation of electrical power systems.

CO4: Analyze different electrical circuits, performance of machines and measuring instruments.

CO5: Evaluate different circuit configurations, Machine performance and Power systems operation.

PART A: BASIC ELECTRICAL ENGINEERING

UNIT I DC & AC Circuits

DC Circuits: Electrical circuit elements (R, L and C), Ohm's Law and its limitations, KCL & KVL, series, parallel, series-parallel circuits, Super Position theorem, Simple numerical problems.

AC Circuits: A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor, Voltage and current relationship with phasor diagrams in R, L, and C circuits, Concept of Impedance, Active power, reactive power and apparent power, Concept of power factor (Simple Numerical problems).

UNIT II Machines and Measuring Instruments

Machines: Construction, principle and operation of (i) DC Motor, (ii) DC Generator, (iii) Single Phase Transformer, (iv) Three Phase Induction Motor and (v) Alternator, Applications of electrical machines.

Measuring Instruments: Construction and working principle of Permanent Magnet Moving Coil (PMMC), Moving Iron (MI) Instruments and Wheat Stone bridge.

UNIT III Energy Resources, Electricity Bill & Safety Measures

Energy Resources: Conventional and non-conventional energy resources; Layout and operation of various Power Generation systems: Hydel, Nuclear, Solar & Wind power generation.

Electricity bill: Power rating of household appliances including air conditioners, PCs, Laptops, Printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers.

Equipment Safety Measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. Personal safety measures: Electric Shock, Earthing and its types, Safety Precautions to avoid shock.

Textbooks:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

Reference Books:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019, Fourth Edition
2. Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers, 2020
3. Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press, 2017
4. Basic Electrical and Electronics Engineering, S. K. Bhatacharya, Person Publications, 2018, Second Edition.

Web Resources:

1. https://nptel.ac.in/courses/108105053
2. https://nptel.ac.in/courses/108108076

PART B: BASIC ELECTRONICS ENGINEERING

Course Objectives:

- To teach the fundamentals of semiconductor devices and its applications, principles of digital electronics.

UNIT I SEMICONDUCTOR DEVICES

Introduction - Evolution of electronics – Vacuum tubes to nano electronics - Characteristics of PN Junction Diode — Zener Effect — Zener Diode and its Characteristics. Bipolar Junction Transistor — CB, CE, CC Configurations and Characteristics — Elementary Treatment of Small Signal CE Amplifier.

UNIT II BASIC ELECTRONIC CIRCUITS AND INSTRUMENTTAION

Rectifiers and power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple zener voltage regulator. Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response. Electronic Instrumentation: Block diagram of an electronic instrumentation system.

UNIT III DIGITAL ELECTRONICS

Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, Gray code, Hamming code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adders. Introduction to sequential circuits, Flip flops, Registers and counters (Elementary Treatment only)

Textbooks:

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009

Reference Books:

1. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand & Co, 2010.
2. Santiram Kal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002.
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

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ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP

(Common to All branches of Engineering)

Course Objectives:

To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.

Course Outcomes:

CO1: Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer.
CO2: Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor.
CO3: Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor.
CO4: Analyse various characteristics of electrical circuits, electrical machines and measuring instruments.
CO5: Design suitable circuits and methodologies for the measurement of various electrical parameters; Household and commercial wiring.

Activities:

1. Familiarization of commonly used Electrical & Electronic Workshop Tools: Bread board, Solder, cables, relays, switches, connectors, fuses, Cutter, plier, screwdriver set, wire stripper, flux, knife/blade, soldering iron, de-soldering pump etc.
   - Provide some exercises so that hardware tools and instruments are learned to be used by the students.

2. Familiarization of Measuring Instruments like Voltmeters, Ammeters, multimeter, LCR-Q meter, Power Supplies, CRO, DSO, Function Generator, Frequency counter.
   - Provide some exercises so that measuring instruments are learned to be used by the students.

3. Components:
   - Familiarization/Identification of components (Resistors, Capacitors, Inductors, Diodes, transistors, IC's etc.) – Functionality, type, size, colour coding package, symbol, cost etc.

- Testing of components like Resistor, Capacitor, Diode, Transistor, ICs etc. - Compare values of components like resistors, inductors, capacitors etc with the measured values by using instruments

PART A: ELECTRICAL ENGINEERING LAB

List of experiments:

1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
4. Magnetization Characteristics of DC shunt Generator
5. Measurement of Power and Power factor using Single-phase wattmeter
6. Measurement of Earth Resistance using Megger
7. Calculation of Electrical Energy for Domestic Premises

Reference Books:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

Note: Minimum Six Experiments to be performed.

PART B: ELECTRONICS ENGINEERING LAB

Course Objectives:

- To impart knowledge on the principles of digital electronics and fundamentals of electron devices & its applications.

Course Outcomes: At the end of the course, the student will be able to
CO1: Identify & testing of various electronic components.
CO2: Understand the usage of electronic measuring instruments.
CO3: Plot and discuss the characteristics of various electron devices.
CO4: Explain the operation of a digital circuit.

List of Experiments:

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers

4. Plot Input & Output characteristics of BJT in CE and CB configurations
5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
8. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

References:

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

Note: Minimum Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software.

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IT WORKSHOP

(Common to all branches of Engineering)

Course Objectives:

- To introduce the internal parts of a computer, peripherals, I/O ports, connecting cables
- To demonstrate configuring the system as Dual boot both Windows and other Operating Systems Viz. Linux, BOSS
- To teach basic command line interface commands on Linux.
- To teach the usage of Internet for productivity and self-paced life-long learning
- To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spread sheets and Presentation tools.

Course Outcomes:

CO1: Perform Hardware troubleshooting.
CO2: Understand Hardware components and inter dependencies.
CO3: Safeguard computer systems from viruses/worms.
CO4: Document/ Presentation preparation.
CO5: Perform calculations using spreadsheets.

PC Hardware & Software Installation

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot (VMWare) with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Task 5: Every student should install BOSS on the computer. The system should be configured as dual boot (VMWare) with both Windows and BOSS. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web

Task1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is

no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD

Task 1 – Word Orientation: The mentor needs to give an overview of La TeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of La TeX and MS office or equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using La TeXand word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using La TeX and Word to create a project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both La TeX and Word.

Task 3: Creating project abstract Features to be covered:- Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

EXCEL

Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 2: Calculating GPA -. Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function,

LOOKUP/VLOOKUP

Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

POWER POINT

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.

Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

AI TOOLS – ChatGPT

Task 1: Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentences to see how the model completes them.

- Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"

Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas

- Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."

Task 3: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output to see how accurate and fluent the translations are.

- Ex:Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

Reference Books:

1. Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dream tech, 2003
2. The Complete Computer upgrade and repair book, Cheryl A Schmidt, WILEY Dream tech, 2013, 3rd edition
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education, 2012, 2nd edition
4. PC Hardware - A Handbook, Kate J. Chase, PHI (Microsoft)
5. LaTeX Companion, Leslie Lamport, PHI/Pearson.
6. IT Essentials PC Hardware and Software Companion Guide, David Anfins on and Ken Quamme. – CISCO Press, Pearson Education, 3rd edition
7. IT Essentials PC Hardware and Software Labs and Study Guide, Patrick Regan– CISCO Press, Pearson Education, 3rd edition

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ENGINEERING GRAPHICS

(Common to All branches of Engineering)

Course Objectives:

- To enable the students with various concepts like dimensioning, conventions and standards related to Engineering Drawing
- To impart knowledge on the projection of points, lines and plane surfaces
- To improve the visualization skills for better understanding of projection of solids
- To develop the imaginative skills of the students required to understand Section of solids and Developments of surfaces.
- To make the students understand the viewing perception of a solid object in Isometric and Perspective projections.

Course Outcomes:

CO1: Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.
CO2: Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.
CO3: Understand and draw projection of solids in various positions in first quadrant.
CO4: Explain principles behind development of surfaces.
CO5: Prepare isometric and perspective sections of simple solids.

UNIT I

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general methods.

Curves: construction of ellipse, parabola and hyperbola by general, Cycloids, Involutes, Normal and tangent to Curves.

Scales: Plain scales, diagonal scales and vernier scales.

UNIT II

Orthographic Projections: Reference plane, importance of reference lines or Plane, Projections of a point situated in any one of the four quadrants.

Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of Straight Line Inclined to both the reference planes

Projections of Planes: regular planes Perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes.

UNIT III

Projections of Solids: Types of solids: Polyhedra and Solids of revolution. Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to another plane.

UNIT IV

Sections of Solids: Perpendicular and inclined section planes, Sectional views and True shape of section, Sections of solids in simple position only.

Development of Surfaces: Methods of Development: Parallel line development and radial line development. Development of a cube, prism, cylinder, pyramid and cone.

UNIT V

Conversion of Views: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

Computer graphics: Creating 2D&3D drawings of objects including PCB and Transformations using Auto CAD (*Not for end examination*).

Textbook:

1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 2016.

Reference Books:

1. Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill, 2013.
2. Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc,2009.
3. Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, Tata McGraw Hill, 2017.

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INTRODUCTION TO PROGRAMMING

(Common to All branches of Engineering)

Course Objectives:

- To introduce students to the fundamentals of computer programming.
- To provide hands-on experience with coding and debugging.
- To foster logical thinking and problem-solving skills using programming.
- To familiarize students with programming concepts such as data types, control structures, functions, and arrays.
- To encourage collaborative learning and teamwork in coding projects.

Course Outcomes: A student after completion of the course will be able to
CO1: Understand basics of computers, the concept of algorithm and algorithmic thinking.
CO2: Analyse a problem and develop an algorithm to solve it.
CO3: Implement various algorithms using the C programming language.
CO4: Understand more advanced features of C language.
CO5: Develop problem-solving skills and the ability to debug and optimize the code.

UNIT I Introduction to Programming and Problem Solving

History of Computers, Basic organization of a computer: ALU, input-output units, memory, program counter, Introduction to Programming Languages, Basics of a Computer Program-Algorithms, flowcharts (Using Dia Tool), pseudo code. Introduction to Compilation and Execution, Primitive Data Types, Variables, and Constants, Basic Input and Output, Operations, Type Conversion, and Casting.

Problem solving techniques: Algorithmic approach, characteristics of algorithm, Problem solving strategies: Top-down approach, Bottom-up approach, Time and space complexities of algorithms.

UNIT II Control Structures

Simple sequential programs Conditional Statements (if, if-else, switch), Loops (for, while, do-while) Break and Continue.

UNIT III Arrays and Strings

Arrays indexing, memory model, programs with array of integers, two dimensional arrays, Introduction to Strings.

UNIT IV Pointers & User Defined Data types

Pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers, User-defined data types-Structures and Unions.

UNIT V Functions & File Handling

Introduction to Functions, Function Declaration and Definition, Function call Return Types and Arguments, modifying parameters inside functions using pointers, arrays as parameters. Scope and Lifetime of Variables, Basics of File Handling

Note: The syllabus is designed with C Language as the fundamental language of implementation**.**

Textbooks:

1. "The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, Prentice-Hall, 1988
2. Schaum's Outline of Programming with C, Byron S Gottfried, McGraw-Hill Education, 1996

Reference Books:

1. Computing fundamentals and C Programming, Balagurusamy, E., McGraw-Hill Education, 2008.
2. Programming in C, Rema Theraja, Oxford, 2016, 2nd edition
3. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE, 3rd edition

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COMPUTER PROGRAMMING LAB

(Common to All branches of Engineering)

Course Objectives:

The course aims to give students hands – on experience and train them on the concepts of the C- programming language.

Course Outcomes:

CO1: Read, understand, and trace the execution of programs written in C language.
CO2: Select the right control structure for solving the problem.
CO3: Develop C programs which utilize memory efficiently using programming constructs like pointers.
CO4: Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.

UNIT I

WEEK 1

Objective: Getting familiar with the programming environment on the computer and writing the first program.

Suggested Experiments/Activities:

Tutorial 1: Problem-solving using Computers.
Lab1: Familiarization with programming environment

i) Basic Linux environment and its editors like Vi, Vim & Emacs etc.
ii) Exposure to Turbo C, gcc
iii) Writing simple programs using printf(), scanf()

WEEK 2

Objective: Getting familiar with how to formally describe a solution to a problem in a series of finite steps both using textual notation and graphic notation.

Suggested Experiments /Activities:

Tutorial 2: Problem-solving using Algorithms and Flow charts.
Lab 1: Converting algorithms/flow charts into C Source code.
Developing the algorithms/flowcharts for the following sample programs

i) Sum and average of 3 numbers
ii) Conversion of Fahrenheit to Celsius and vice versa
iii) Simple interest calculation

WEEK 3
Objective: Learn how to define variables with the desired data-type, initialize them with appropriate values and how arithmetic operators can be used with variables and constants.

Suggested Experiments/Activities:
Tutorial 3: Variable types and type conversions:

Lab 3: Simple computational problems using arithmetic expressions.
i) Finding the square root of a given number
ii) Finding compound interest
iii) Area of a triangle using heron's formulae
iv) Distance travelled by an object

UNIT II

WEEK 4
Objective: Explore the full scope of expressions, type-compatibility of variables & constants and operators used in the expression and how operator precedence works.

Suggested Experiments/Activities:

Tutorial4: Operators and the precedence and as associativity:
Lab4: Simple computational problems using the operator' precedence and associativity
i) Evaluate the following expressions.
    a. A+B*C+(D*E) + F*G
    b. A/B*C-B+A*D/3
    c. A+++B---A
    d. J= (i++) + (++i)
ii) Find the maximum of three numbers using conditional operator
iii) Take marks of 5 subjects in integers, and find the total, average in float

WEEK 5
Objective: Explore the full scope of different variants of "if construct" namely if-else, null-else, if-else if*-else, switch and nested-if including in what scenario each one of them can be used and how to use them. Explore all relational and logical operators while writing conditionals for "if construct".

Suggested Experiments/Activities:
Tutorial 5: Branching and logical expressions:
Lab 5: Problems involving if-then-else structures.
i) Write a C program to find the max and min of four numbers using if-else.
ii) Write a C program to generate electricity bill.
iii) Find the roots of the quadratic equation.
iv) Write a C program to simulate a calculator using switch case.
v) Write a C program to find the given year is a leap year or not.

WEEK 6
Objective: Explore the full scope of iterative constructs namely while loop, do-while loop and

for loop in addition to structured jump constructs like break and continue including when each of these statements is more appropriate to use.

Suggested Experiments/Activities:
Tutorial 6: Loops, while and for loops
Lab 6: Iterative problems e.g., the sum of series

i) Find the factorial of given number using any loop.
ii) Find the given number is a prime or not.
iii) Compute sine and cos series
iv) Checking a number palindrome
v) Construct a pyramid of numbers.

UNIT III

WEEK 7:
Objective: Explore the full scope of Arrays construct namely defining and initializing 1-D and 2-D and more generically n-D arrays and referencing individual array elements from the defined array. Using integer 1-D arrays, explore search solution linear search.

Suggested Experiments/Activities:
Tutorial 7: 1 D Arrays: searching.
Lab 7:1D Array manipulation, linear search

i) Find the min and max of a 1-D integer array.
ii) Perform linear search on1D array.
iii) The reverse of a 1D integer array
iv) Find 2's complement of the given binary number.
v) Eliminate duplicate elements in an array.

WEEK 8:
Objective: Explore the difference between other arrays and character arrays that can be used as Strings by using null character and get comfortable with string by doing experiments that will reverse a string and concatenate two strings. Explore sorting solution bubble sort using integer arrays.

Suggested Experiments/Activities:
Tutorial 8: 2 D arrays, sorting and Strings.
Lab 8: Matrix problems, String operations, Bubble sort

i) Addition of two matrices
ii) Multiplication two matrices
iii) Sort array elements using bubble sort
iv) Concatenate two strings without built-in functions
v) Reverse a string using built-in and without built-in string functions

UNIT IV

WEEK 9:
Objective: Explore pointers to manage a dynamic array of integers, including memory allocation & value initialization, resizing changing and reordering the contents of an array

and memory de-allocation using malloc (), calloc (), realloc () and free () functions. Gain experience processing command-line arguments received by C

Suggested Experiments/Activities:
Tutorial 9: Pointers, structures and dynamic memory allocation
Lab 9: Pointers and structures, memory dereference.

i) Write a C program to find the sum of a 1D array using malloc()
ii) Write a C program to find the total, average of n students using structures
iii) Enter n students data using calloc() and display failed students list
iv) Read student name and marks from the command line and display the student details along with the total.
v) Write a C program to implement realloc()

WEEK 10:
Objective: Experiment with C Structures, Unions, bit fields and self-referential structures (Singly linked lists) and nested structures

Suggested Experiments/Activities:
Tutorial 10: Bitfields, Self-Referential Structures, Linked lists
Lab10 : Bitfields, linked lists
Read and print a date using dd/mm/yyyy format using bit-fields and differentiate the same without using bit- fields

i) Create and display a singly linked list using self-referential structure.
ii) Demonstrate the differences between structures and unions using a C program.
iii) Write a C program to shift/rotate using bitfields.
iv) Write a C program to copy one structure variable to another structure of the same type.

UNIT V

WEEK 11:
Objective: Explore the Functions, sub-routines, scope and extent of variables, doing some experiments by parameter passing using call by value. Basic methods of numerical integration

Suggested Experiments/Activities:
Tutorial 11: Functions, call by value, scope and extent,
Lab 11: Simple functions using call by value, solving differential equations using Eulers theorem.

i) Write a C function to calculate NCR value.
ii) Write a C function to find the length of a string.
iii) Write a C function to transpose of a matrix.
iv) Write a C function to demonstrate numerical integration of differential equations using Euler's method

WEEK 12:
Objective: Explore how recursive solutions can be programmed by writing recursive functions that can be invoked from the main by programming at-least five distinct problems that have naturally recursive solutions.

Suggested Experiments/Activities:
Tutorial 12: Recursion, the structure of recursive calls
Lab 12: Recursive functions

i) Write a recursive function to generate Fibonacci series.
ii) Write a recursive function to find the lcm of two numbers.
iii) Write a recursive function to find the factorial of a number.
iv) Write a C Program to implement Ackermann function using recursion.
v) Write a recursive function to find the sum of series.

WEEK 13:
Objective: Explore the basic difference between normal and pointer variables, Arithmetic operations using pointers and passing variables to functions using pointers

Suggested Experiments/Activities:
Tutorial 13: Call by reference, dangling pointers
Lab 13: Simple functions using Call by reference, Dangling pointers.

i) Write a C program to swap two numbers using call by reference.
ii) Demonstrate Dangling pointer problem using a C program.
iii) Write a C program to copy one string into another using pointer.
iv) Write a C program to find no of lowercase, uppercase, digits and other characters using pointers.

WEEK14:
Objective: To understand data files and file handling with various file I/O functions. Explore the differences between text and binary files.

Suggested Experiments/Activities:
Tutorial 14: File handling
Lab 14: File operations

i) Write a C program to write and read text into a file.
ii) Write a C program to write and read text into a binary file using fread() and fwrite()
iii) Copy the contents of one file to another file.
iv) Write a C program to merge two files into the third file using command-line arguments.
v) Find no. of lines, words and characters in a file
vi) Write a C program to print last n characters of a given file.

Textbooks:

1. Ajay Mittal, Programming in C: A practical approach, Pearson.
2. Byron Gottfried, Schaum' s Outline of Programming with C, McGraw Hill

Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice-Hall of India
2. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE

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ENGINEERING MECHANICS

(Common to Civil, Mechanical Engineering & Allied branches)

Course Objectives:

- To get familiarized with different types of force systems.
- To draw accurate free body diagrams representing forces and moments acting on a body to analyze the equilibrium of system of forces.
- To teach the basic principles of center of gravity, centroid and moment of inertia and determine them for different simple and composite bodies.
- To apply the Work-Energy method to particle motion.
- To understand the kinematics and kinetics of translational and rotational motion of rigid bodies.

Course Outcomes: On Completion of the course, the student should be able to
CO1: Understand the fundamental concepts in mechanics and determine the frictional forces for bodies in contact.
CO2: Analyze different force systems such as concurrent, coplanar and spatial systems and calculate their resultant forces and moments.
CO3: Calculate the centroids, center of gravity and moment of inertia of different geometrical shapes.
CO4: Apply the principles of work-energy and impulse-momentum to solve the problems of rectilinear and curvilinear motion of a particle.
CO5: Solve the problems involving the translational and rotational motion of rigid bodies.

UNIT I

Introduction to Engineering Mechanics– Basic Concepts. Scope and Applications
Systems of Forces: Coplanar Concurrent Forces– Components in Space–Resultant–Moment of Force and its Application –Couples and Resultant of Force Systems.
Friction: Introduction**,** limiting friction and impending motion, Coulomb'slaws of dryfriction, coefficient of friction, Cone of Static friction.

UNIT II

Equilibrium of Systems of Forces: Free Body Diagrams, Lami's Theorm, Equations of Equilibrium of Coplanar Systems, Graphical method for the equilibrium, Triangle law of forces, converse of the law of polygon of forces condition of equilibrium, Equations of Equilibrium for Spatial System of forces, Numerical examples on spatial system of forces using vector approach, Analysis of plane trusses.
Principle of virtual work with simple examples

UNIT III

Centroid: Centroids of simple figures (from basic principles)–Centroids of Composite Figures.
Centre of Gravity: Centre of gravity of simple body (from basic principles), Centre of gravity of composite bodies, Pappus theorems.

Area Moments of Inertia: Definition– Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia.
Mass Moment of Inertia: Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia, Mass Moment of Inertia of composite bodies.

UNIT IV

Rectilinear and Curvilinear motion of a particle: Kinematics and Kinetics –D'Alembert's Principle - Work Energy method and applications to particle motion-Impulse Momentum method.

UNIT V

Rigid body Motion: Kinematics and Kinetics of translation, Rotation about fixed axis and plane motion, Work Energy method and Impulse Momentum method.

Textbooks:

1. Engineering Mechanics, S. Timoshenko, D. H. Young, J.V. Rao, S. Pati., , McGraw Hill Education 2017. 5th Edition.
2. Engineering Mechanics, P.C.Dumir- S.Sengupta and Srinivas V veeravalli , University press. 2020. First Edition.
3. A Textbook of Engineering Mechanics, S.S Bhavikatti. New age international publications 2018. 4th Edition.

Reference Books:

1. Engineering Mechanics, Statics and Dynamics, Rogers and M A. Nelson., McGraw Hill Education. 2017. First Edition.
2. Engineering Mechanics, Statics and Dynamics, I.H. Shames., PHI, 2002. 4th Edition.
3. Engineering Mechanics, Volume-I: Statics, Volume-II: Dynamics, J. L. Meriam and L. G. Kraige., John Wiley, 2008. 6th Edition.
4. Introduction to Statics and Dynamics, Basudev Battachatia, Oxford University Press, 2014. Second Edition
5. Engineering Mechanics: Statics and Dynamics, Hibbeler R.C., Pearson Education, Inc., New Delhi, 2022, 14th Edition

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ENGINEERING MECHANICS & BUILDING PRACTICES LAB

(Civil Engineering & allied branches)

Course Objectives: The students completing the course are expected to

- Verify the Law of Parallelogram of Forces and Lami's theorem.
- Determine the coefficients of friction of Static and Rolling friction and Centre of gravity of different plane Lamina.
- Understand the layout of a building, concepts of Non-Destructive Testing and different Alternative Materials.

Course Outcomes: On completion of the course, the student should be able to:

CO1: Evaluate the coefficient of friction between two different surfaces and between the inclined plane and the roller.

CO2: Verify Law of Parallelogram of forces and Law of Moment using force polygon and bell crank lever.

CO3: Determine the Centre of gravity different configurations and

CO4: Understand the Quality Testing and Assessment Procedures and principles of Non-Destructive Testing.

CO5: Exposure to safety practices in the construction industry.

Students have to perform any 10 of the following Experiments:

1. To study various types of tools used in construction.
2. Forces in Pin Jointed Trusses
3. Experimental Proof of Lami's Theorem
4. Verification of Law of Parallelogram of Forces.
5. Determination of Center of Gravity of different shaped Plane Lamina.
6. Determination of coefficient of Static and Rolling Friction.
7. Verification of Law of Moment using Rotation Disc Apparatus and Bell Crank Lever
8. Study of Alternative Materials like M-sand, Fly ash, Sea Sand etc.
9. Field-Visit to understand the Quality Testing - report.
10. Safety Practices in Construction industry
11. Demonstration of Non-Destructive Testing - using Rebound Hammer & UPV
12. Study of Plumbing in buildings.

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ENGINEERING MECHANICS LAB

(Mechanical Engineering & allied branches)

Course Objectives: The students completing the course are expected to:

- Verify the Law of Parallelogram and Triangle of Forces.
- Determine the coefficients of friction of Static and Rolling friction and Centre of gravity of different plane Lamina.
- Analyse the system of Pulleys and Moment of Inertia of Compound Pendulum and Flywheel.

Course Outcomes:

CO1: Evaluate the coefficient of friction between two different surfaces and between the inclined plane and the roller.
CO2: Verify Law of Polygon of forces and Law of Moment using force polygon and bell crank lever.
CO3: Determine the Centre of gravity and Moment of Inertia of different configurations.
CO4: Verify the equilibrium conditions of a rigid body under the action of different force systems.

Students have to perform any 10 of the following Experiments:

List of Experiments:

1. Verification of Law of Parallelogram of Forces.
2. Verification of Law of Triangle of Forces.
3. Verification of the Law of polygon for coplanar-concurrent forces acting on a particle in equilibrium and to find the value of unknown forces considering particle to be in equilibrium using universal force table.
4. Determination of coefficient of Static and Rolling Frictions
5. Determination of Centre of Gravity of different shaped Plane Lamina.
6. Verification of the conditions of equilibrium of a rigid body under the action of coplanar non-concurrent, parallel force system with the help of a simply supported beam.
7. Study of the systems of pulleys and draw the free body diagram of the system.
8. Determine the acceleration due to gravity using a compound pendulum.
9. Determine the Moment of Inertia of the compound pendulum about an axis perpendicular to the plane of oscillation and passing through its centre of mass.
10. Determine the Moment of Inertia of a Flywheel.
11. Verification of Law of Moment using Rotation Disc Apparatus and Bell Crank Lever.

References:

1. S. Timoshenko, D. H. Young, J.V. Rao, S. Pati., Engineering Mechanics, 5th Edition, McGraw Hill Education.
2. Hibbeler R.C., Engineering Mechanics: Statics and Dynamics, 14th Edition, Pearson Education, Inc., New Delhi, 2022

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ELECTRICAL CIRCUIT ANALYSIS -I

(EEE & allied branches)

Course Objectives:

To develop an understanding of the fundamental laws, elements of electrical circuits and to apply circuit analysis to DC and AC circuits.

Course Outcomes:

CO1: Remembering the basic electrical elements and different fundamental laws.
CO2: Understand the network reduction techniques, transformations, concept of self-inductance and mutual inductance, phasor diagrams, resonance and network theorems.
CO3: Apply the concepts to obtain various mathematical and graphical representations.
CO4: Analyse nodal and mesh networks, series and parallel circuits, steady state response, different circuit topologies (with R, L and C components).
CO5: Evaluation of Network theorems, electrical, magnetic and single-phase circuits.

UNIT I INTRODUCTION TO ELECTRICAL CIRCUITS

Basic Concepts of passive elements of R, L, C and their V-I relations, Sources (dependent and independent), Kirchoff's laws, Network reduction techniques (series, parallel, series - parallel, star-to-delta and delta-to-star transformation), source transformation technique, nodal analysis and mesh analysis to DC networks with dependent and independent voltage and current sources, node and mesh analysis.

UNIT II MAGNETIC CIRCUITS

Basic definition of MMF, flux and reluctance, analogy between electrical and magnetic circuits, Faraday's laws of electromagnetic induction – concept of self and mutual inductance, Dot convention – coefficient of coupling and composite magnetic circuit, analysis of series and parallel magnetic circuits.

UNIT III SINGLE PHASE CIRCUITS

Characteristics of periodic functions, Average value, R.M.S. value, form factor, representation of a sine function, concept of phasor, phasor diagrams, node and mesh analysis. Steady state analysis of R, L and C circuits to sinusoidal excitations-response of pure resistance, inductance, capacitance, series RL circuit, series RC circuit, series RLC circuit, parallel RL circuit, parallel RC circuit.

UNIT IV RESONANCE AND LOCUS DIAGRAMS

Series Resonance: Characteristics of a series resonant circuit, Q-factor, selectivity and bandwidth, expression for half power frequencies; Parallel resonance: Q-factor, selectivity and bandwidth; Locus diagram: RL, RC, RLC with R, L and C variables.

UNIT V NETWORK THEOREMS (DC & AC EXCITATIONS)

Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem, Reciprocity theorem, Millman's theorem and compensation theorem

Textbooks:

1. Engineering Circuits Analysis, Jack Kemmerly, William Hayt and Steven Durbin, Tata Mc Graw Hill Education, 2005, sixth edition.
2. Network Analysis, M. E. Van Valkenburg, Pearson Education, 2019, Revised Third Edition

Reference Books:

1. Fundamentals of Electrical Circuits, Charles K. Alexander and Mathew N.O. Sadiku, Mc Graw Hill Education (India), 2013, Fifth Edition
2. Electric Circuits (Schaum's outline Series), Mahmood Nahvi, Joseph Edminister, and K. Rao, Mc Graw Hill Education, 2017, Fifth Edition.
3. Electric Circuits, David A. Bell, Oxford University Press, 2009, Seventh Edition.
4. Introductory Circuit Analysis, Robert L Boylestad, Pearson Publications, 2023, Fourteenth Edition.
5. Circuit Theory: Analysis and Synthesis, A. Chakrabarti, Dhanpat Rai & Co., 2018, Seventh Revised Edition.

Web Resources:

1. https://onlinecourses.nptel.ac.in/noc23_ee81/preview
2. https://nptel.ac.in/courses/108104139
3. https://nptel.ac.in/courses/108106172
4. https://nptel.ac.in/courses/117106108

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ELECTRICAL CIRCUITS LAB

(EEE & allied branches)

Course Objectives:

To impart hands on experience in verification of circuit laws and theorems, measurement of circuit parameters, study of circuit characteristics. It also gives practical exposure to the usage of different circuits with different conditions.

Course Outcomes:

CO1: Understand the concepts of network theorems, node and mesh networks, series and parallel resonance and Locus diagrams.
CO2: Apply various theorems to compare practical results obtained with theoretical calculations.
CO3: Determine self, mutual inductances and coefficient of coupling values, parameters of choke coil.
CO4: Analyse different circuit characteristics with the help of fundamental laws and various configurations.
CO5: Create locus diagrams of RL, RC series circuits and examine series and parallel resonance.

List of Experiments:

1. Verification of Kirchhoff's circuit laws.
2. Verification of node and mesh analysis.
3. Verification of network reduction techniques.
4. Determination of cold and hot resistance of an electric lamp
5. Determination of Parameters of a choke coil.
6. Determination of self, mutual inductances, and coefficient of coupling
7. Series and parallel resonance
8. Locus diagrams of R-L (L Variable) and R-C (C Variable) series circuits
9. Verification of Superposition theorem
10. Verification of Thevenin’s and Norton’s Theorems
11. Verification of Maximum power transfer theorem
12. Verification of Compensation theorem
13. Verification of Reciprocity and Millman’s Theorems

Reference Books:

1. Engineering Circuits Analysis, Jack Kemmerly, William Hayt and Steven Durbin, Tata Mc Graw Hill Education, 2005, sixth edition.
2. Network Analysis, M. E. Van Valkenburg, Pearson Education, 2019, Revised Third Edition

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NETWORK ANALYSIS

(ECE & allied branches)

Course Objectives:

- To introduce basic laws, mesh & nodal analysis techniques for solving electrical circuits
- To impart knowledge on applying appropriate theorem for electrical circuit analysis
- To explain transient behavior of circuits in time and frequency domains
- To teach concepts of resonance
- To introduce open circuit, short circuit, transmission, hybrid parameters and their interrelationship.

Course Outcomes: At the end of this course students will demonstrate the ability to

CO1: Understand basic electrical circuits with nodal and mesh analysis.
CO2: Analyse the circuit using network simplification theorems.
CO3: Find Transient response and Steady state response of a network.
CO4: Analyse electrical networks in the Laplace domain.
CO5: Compute the parameters of a two-port network.

UNIT I

Types of circuit components, Types of Sources and Source Transformations, Mesh analysis and Nodal analysis, problem solving with resistances only including dependent sources also. Principal of Duality with examples.

Network Theorems: Thevenin's, Norton's, Milliman's, Reciprocity, Compensation, Substitution, Superposition, Max Power Transfer, Tellegens - problem solving using dependent sources also.

UNIT II

Transients: First order differential equations, Definition of time constants, R-L circuit, R-C circuit with DC excitation, evaluating initial conditions procedure, second order differential equations, homogeneous, non-homogenous, problem-solving using R-L-C elements with DC excitation and AC excitation, Response as related to s-plane rotation of roots.

Laplace transform: introduction, Laplace transformation, basic theorems, problem solving using Laplace transform, partial fraction expansion, Heaviside's expansions, problem solving using Laplace transform.

UNIT III

Steady State Analysis of A.C Circuits: Impedance concept, phase angle, series R-L, R-C, R-L-C circuits problem solving. Complex impedance and phasor notation for R-L, R-C, R-L-C problem solving using mesh and nodal analysis, Star-Delta conversion, problem solving using Laplace transforms also.

UNIT IV

Resonance: Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance, general case-resistance present in both branches, anti-resonance at all frequencies.

Coupled Circuits: Coupled Circuits: Self-inductance, Mutual inductance, Coefficient of coupling, analysis of coupled circuits, Natural current, Dot rule of coupled circuits, conductively coupled equivalent circuits- problem solving.

UNIT V

Two-port Networks: Relationship of two port networks, Z-parameters, Y-parameters, Transmission line parameters, h- parameters, Relationships Between parameter Sets, Parallel & series connection of two port networks, cascading of two port networks, problem solving using dependent sources also.

Image and iterative impedances. Image and iterative transfer constants. Insertion loss. Attenuators and pads. Lattice network and its parameters. Impedance matching networks.

Textbooks:

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, revised 3rd Edition, 2019.
2. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, 9th Edition 2020.
3. Network lines and Fields by John. D. Ryder 2nd Edition, PHI

Reference Books:

1. D. Roy Choudhury, Networks and Systems, New Age International Publications, 2013.
2. Joseph Edminister and Mahmood Nahvi, Electric Circuits, Schaum's Outline Series, 7th Edition, Tata McGraw Hill Publishing Company, New Delhi, 2017
3. Fundamentals of Electric Circuits by Charles K. Alexander and Matthew N. O. Sadiku, McGraw-Hill Education.

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NETWORK ANALYSIS AND SIMULATION LABORATORY

(ECE & allied branches)

Course Objectives:

- To gain hands on experience in verifying Kirchoff's laws and network theorems
- To analyze transient behavior of circuits
- To study resonance characteristics
- To determine 2-port network parameters

Course Outcomes:

CO1: Verify Kirchoff's laws and network theorems.
CO2: Measure time constants of RL & RC circuits.
CO3: Analyze behavior of RLC circuit for different cases.
CO4: Design resonant circuit for given specifications.
CO5: Characterize and model the network in terms of all network parameters.

The following experiments need to be performed using both Hardware and simulation Software.

The experiments need to be simulated using software and the same need to be verified using the hardware.

1. Study of components of a circuit and Verification of KCL and KVL.
2. Verification of mesh and nodal analysis for AC circuits
3. Verification of Superposition, Thevenin's & Norton theorems for AC circuits
4. Verification of maximum power transfer theorem for AC circuits
5. Verification of Tellegen's theorem for two networks of the same topology.
6. Study of DC transients in RL, RC and RLC circuits
7. To study frequency response of various 1^{st} order RL & RC networks
8. To study the transient and steady state response of a 2^{nd} order circuit by varying its various parameters and studying their effects on responses
9. Find the Q Factor and Bandwidth of a Series and Parallel Resonance circuit.
10. Determination of open circuit (Z) and short circuit (Y) parameters
11. Determination of hybrid (H) and transmission (ABCD) parameters
12. To measure two port parameters of a twin-T network and study its frequency response.

Hardware Requirements:

Regulated Power supplies, Analog/Digital Function Generators, Digital Multimeters, Decade Resistance Boxes/Rheostats, Decade Capacitance Boxes, Ammeters (Analog or Digital), Voltmeters (Analog or Digital), Active & Passive Electronic Components

Software requirements:

Multisim/ Pspice/Equivalent simulation software tool, Computer Systems with required specifications

References:

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, revised 3rd Edition, 2019.
2. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, 9th Edition 2020.

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DATA STRUCTURES

(Common to CSE, IT & allied branches)

Course Objectives:

- To provide the knowledge of basic data structures and their implementations.
- To understand importance of data structures in context of writing efficient programs.
- To develop skills to apply appropriate data structures in problem solving.

Course Outcomes: At the end of the course, Student will be able to

CO1: Explain the role of linear data structures in organizing and accessing data efficiently in algorithms.

CO2: Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.

CO3: Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.

CO4: Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues, and apply them appropriately to solve data management challenges.

CO5: Devise novel solutions to small scale programming challenges involving data structures such as stacks, queues, Trees.

CO6: Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.

UNIT I

Introduction to Linear Data Structures: Definition and importance of linear data structures, Abstract data types (ADTs) and their implementation, Overview of time and space complexity analysis for linear data structures. Searching Techniques: Linear & Binary Search, Sorting Techniques: Bubble sort, Selection sort, Insertion Sort

UNIT II

Linked Lists: Singly linked lists: representation and operations, doubly linked lists and circular linked lists, Comparing arrays and linked lists, Applications of linked lists.

UNIT III

Stacks: Introduction to stacks: properties and operations, implementing stacks using arrays and linked lists, Applications of stacks in expression evaluation, backtracking, reversing list etc.

UNIT IV

Queues: Introduction to queues: properties and operations, implementing queues using arrays and linked lists, Applications of queues in breadth-first search, scheduling, etc.

Deques: Introduction to deques (double-ended queues), Operations on deques and their applications.

UNIT V

Trees: Introduction to Trees, Binary Search Tree – Insertion, Deletion & Traversal

Hashing: Brief introduction to hashing and hash functions, Collision resolution techniques: chaining and open addressing, Hash tables: basic implementation and operations, Applications of hashing in unique identifier generation, caching, etc.

Textbooks:

1. Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition.
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Silicon Press, 2008

Reference Books:

1. Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders
2. C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft
3. Problem Solving with Algorithms and Data Structures" by Brad Miller and David Ranum
4. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein
5. Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms" by Robert Sedgewick

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DATA STRUCTURES LAB

(Common to CSE, IT & allied branches)

Course Objectives:

The course aims to strengthen the ability of the students to identify and apply the suitable data structure for the given real-world problem. It enables them to gain knowledge in practical applications of data structures.

Course Outcomes: At the end of the course, Student will be able to

CO1: Explain the role of linear data structures in organizing and accessing data efficiently in algorithms.
CO2: Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.
CO3: Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.
CO4: Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues and apply them appropriately to solve data management challenges.
CO5: Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.

List of Experiments:

Exercise 1: Array Manipulation

i) Write a program to reverse an array.
ii) C Programs to implement the Searching Techniques – Linear & Binary Search
iii) C Programs to implement Sorting Techniques – Bubble, Selection and Insertion Sort

Exercise 2: Linked List Implementation

i) Implement a singly linked list and perform insertion and deletion operations.
ii) Develop a program to reverse a linked list iteratively and recursively.
iii) Solve problems involving linked list traversal and manipulation.

Exercise 3: Linked List Applications

i) Create a program to detect and remove duplicates from a linked list.
ii) Implement a linked list to represent polynomials and perform addition.
iii) Implement a double-ended queue (deque) with essential operations.

Exercise 4: Double Linked List Implementation

i) Implement a doubly linked list and perform various operations to understand its properties and applications.
ii) Implement a circular linked list and perform insertion, deletion, and traversal.

Exercise 5: Stack Operations

i) Implement a stack using arrays and linked lists.
ii) Write a program to evaluate a postfix expression using a stack.
iii) Implement a program to check for balanced parentheses using a stack.

Exercise 6: Queue Operations

i) Implement a queue using arrays and linked lists.
ii) Develop a program to simulate a simple printer queue system.
iii) Solve problems involving circular queues.

Exercise 7: Stack and Queue Applications

i) Use a stack to evaluate an infix expression and convert it to postfix.
ii) Create a program to determine whether a given string is a palindrome or not.
iii) Implement a stack or queue to perform comparison and check for symmetry.

Exercise 8: Binary Search Tree

i) Implementing a BST using Linked List.
ii) Traversing of BST.

Exercise 9: Hashing

i) Implement a hash table with collision resolution techniques.
ii) Write a program to implement a simple cache using hashing.

Textbooks:

1. Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition.
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Silicon Press, 2008

Reference Books:

1. Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders
2. C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft
3. Problem Solving with Algorithms and Data Structures" by Brad Miller and David Ranum
4. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein
5. Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms by Robert Sedgewick.

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HEALTH AND WELLNESS, YOGA AND SPORTS

(Common to All branches of Engineering)

Course Objectives:

The main objective of introducing this course is to make the students maintain their mental and physical wellness by balancing emotions in their life. It mainly enhances the essential traits required for the development of the personality.

Course Outcomes: After completion of the course the student will be able to

CO1: Understand the importance of yoga and sports for Physical fitness and sound health.
CO2: Demonstrate an understanding of health-related fitness components.
CO3: Compare and contrast various activities that help enhance their health.
CO4: Assess current personal fitness levels.
CO5: Develop Positive Personality

UNIT I

Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index (BMI) of all age groups.

Activities:

i) Organizing health awareness programmes in community
ii) Preparation of health profile
iii) Preparation of chart for balance diet for all age groups

UNIT II

Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas- Pranayama and meditation, stress management and yoga, Mental health and yoga practice.

Activities:

Yoga practices – Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar

UNIT III

Concept of Sports and fitness, importance, fitness components, history of sports, Ancient and Modern Olympics, Asian games and Commonwealth games.

Activities:

i) Participation in one major game and one individual sport viz., Athletics, Volleyball, Basketball, Handball, Football, Badminton, Kabaddi, Kho-kho, Table tennis, Cricket etc.
   Practicing general and specific warm up, aerobics
ii) Practicing cardiorespiratory fitness, treadmill, run test, 9 min walk, skipping and running.

Reference Books:

1. Gordon Edlin, Eric Golanty. Health and Wellness, 14th Edn. Jones & Bartlett Learning, 2022
2. T.K.V.Desikachar. The Heart of Yoga: Developing a Personal Practice
3. Archie J.Bahm. Yoga Sutras of Patanjali, Jain Publishing Company, 1993
4. Wiseman, John Lofty, SAS Survival Handbook: The Ultimate Guide to Surviving Anywhere Third Edition, William Morrow Paperbacks, 2014
5. The Sports Rules Book/ Human Kinetics with Thomas Hanlon. -- 3rd ed. Human Kinetics, Inc.2014

General Guidelines:

1. Institutes must assign slots in the Timetable for the activities of Health/Sports/Yoga.
2. Institutes must provide field/facility and offer the minimum of five choices of as many as Games/Sports.
3. Institutes are required to provide sports instructor / yoga teacher to mentor the students.

Evaluation Guidelines:

- Evaluated for a total of 100 marks.
- A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks.
- A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.

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NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVICE

(Common to All branches of Engineering)

Course Objectives:
The objective of introducing this course is to impart discipline, character, fraternity, teamwork, social consciousness among the students and engaging them in selfless service.

Course Outcomes: After completion of the course the students will be able to

CO1: Understand the importance of discipline, character and service motto.
CO2: Solve some societal issues by applying acquired knowledge, facts, and techniques.
CO3: Explore human relationships by analyzing social problems.
CO4: Determine to extend their help for the fellow beings and downtrodden people.
CO5: Develop leadership skills and civic responsibilities.

UNIT I Orientation

General Orientation on NSS/NCC/ Scouts & Guides/Community Service activities, career guidance.

Activities:

i) Conducting –ice breaking sessions-expectations from the course-knowing personal talents and skills
ii) Conducting orientations programs for the students –future plans-activities-releasing road map etc.
iii) Displaying success stories-motivational biopics- award winning movies on societal issues etc.
iv) Conducting talent show in singing patriotic songs-paintings- any other contribution.

UNIT II Nature & Care

Activities:

i) Best out of waste competition.
ii) Poster and signs making competition to spread environmental awareness.
iii) Recycling and environmental pollution article writing competition.
iv) Organising Zero-waste day.
v) Digital Environmental awareness activity via various social media platforms.
vi) Virtual demonstration of different eco-friendly approaches for sustainable living.
vii) Write a summary on any book related to environmental issues.

UNIT III Community Service

Activities:

i) Conducting One Day Special Camp in a village contacting village-area leaders- Survey in the village, identification of problems- helping them to solve via media- authorities-experts-etc.

ii) Conducting awareness programs on Health-related issues such as General Health, Mental health, Spiritual Health, HIV/AIDS,
iii) Conducting consumer Awareness. Explaining various legal provisions etc.
iv) Women Empowerment Programmes- Sexual Abuse, Adolescent Health and Population Education.
v) Any other programmes in collaboration with local charities, NGOs etc.

Reference Books:

1. Nirmalya Kumar Sinha & Surajit Majumder, *A Text Book of National Service Scheme* Vol;.I, Vidya Kutir Publication, 2021 (ISBN 978-81-952368-8-6)
2. *Red Book - National Cadet Corps* – Standing Instructions Vol I & II, Directorate General of NCC, Ministry of Defence, New Delhi
3. Davis M. L. and Cornwell D. A., "Introduction to Environmental Engineering", McGraw Hill, New York 4/e 2008
4. Masters G. M., Joseph K. and Nagendran R. "Introduction to Environmental Engineering and Science", Pearson Education, New Delhi. 2/e 2007
5. Ram Ahuja. *Social Problems in India*, Rawat Publications, New Delhi.

General Guidelines:

1. Institutes must assign slots in the Timetable for the activities.
2. Institutes are required to provide instructor to mentor the students.

Evaluation Guidelines:

- Evaluated for a total of 100 marks.
- A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks.
- A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.

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MODEL ENGINEERING CURRICULUM - 2023

B. Tech Regular / Honors



ANDHRA PRADESH STATE COUNCIL OF HIGHER EDUCATION

(A Statutory Body of the Government of A.P)

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