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**

CALCULUS AND DIFFERENTIAL EQUATIONS

I Year B. Tech. I Semester

[Common to EEE, ECE, CSE, IT, CSE (AI&ML)]

L	T	P	C
3	0	0	3

Course Code: 24BM11RC01

Course Outcomes: At the end of the Course, the student shall be able to

CO1: Examine the functional dependency and utilize Taylor's theorem to expand the 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: **8 Lectures**

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 Textbook]

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: **7 Lectures**

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 Textbook]

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: **11 Lectures**

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 Textbook]

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)

UNIT-IV: **11 Lectures**

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 Textbook]

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: **11 Lectures**

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 Textbook]

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:

1. 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

ENGINEERING PHYSICS

I Year B. Tech. I Semester

[Common to ECE, EEE, CSE (AI&ML)]

Course Code: 24BP11RC01

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to:

CO1: Apply the principles of interference, diffraction, and polarization in wave optics, and utilize optical instruments for practical applications. (L3)

CO2: Familiarize the basic concepts of Thermodynamics relevant to engineering applications. (L2)

CO3: Outline the knowledge of basic principles of Electromagnetism and EM Waves. (L2)

CO4: Describe the basic principles of lasers, optical fibres and their use in technological applications. (L2)

CO5: Understand the basic principles of Quantum mechanics, Quantum computing. (L2)

UNIT-I **10 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 **7 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)

UNIT-III **11 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 **10 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 **10 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; Textbook -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)

Textbooks:

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)

ELEMENTS OF ELECTRONICS ENGINEERING

I Year B. Tech. I Semester

[CSE(AI&ML)]

Course Code: 24EC11RC04

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 8 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; Chapter -2 Section 2.2, 2.3, 2.9; 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 11 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; Chapter 5 Section 5.3, 5.4, 5.7; 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 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 **11 Lectures**

Bi-Polar 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 characteristics of different transistor biasing techniques (L3)

UNIT-IV **8 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 **10 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)

Textbooks:

1. Jacob Millman, Christos C. Halkias, Integrated Electronics: Analog and Digital Circuits and Systems, McGRAW-HILL. 1972
2. 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. 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

Web References:

1. https://onlinecourses.nptel.ac.in/noc21_ee80/preview
2. https://be-iitkgp.vlabs.ac.in/

FUNDAMENTALS OF COMPUTERS

I Year B. Tech. I semester
[Common to CSE, CSE (AI&ML), IT]

Course Code: 24CT11RC01

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the Course, the student shall be able to:

CO1: Identify different I/O devices and their usage. (L3)

CO2: Compare different computer memory with their efficiency. (L3)

CO3: Relate different computer software's and programming languages for solving problems. (L2)

CO4: Summarize the use of operating system, database system, and computer network in the field of computing in engineering. (L2)

CO5: Infer the methods and applications of artificial intelligence (AI), machine learning (ML) and data science. (L3)

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 with respect to 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 Object-oriented Programming. (L2)

UNIT-IV **10 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)

Textbooks:

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)

PROBLEM SOLVING USING C

I Year B. Tech. I semester

[Common to CSE, CSE (AI&ML), IT, ECE]

L	T	P	C
3	0	0	3

Course Code: 24CT11RC02

Course Outcomes: At the end of the Course, the student shall be able to

CO1: Explain the basic constructs of C through the use of simple applications. (L2)

CO2: Demonstrate the utilization of arrays and strings in the development of C programs. (L2)

CO3: Utilize functions and pointers to construct various applications in C. (L3)

CO4: Apply concepts of structures and unions to build and implement C applications. (L3)

CO5: Develop applications using sequential and random-access file processing techniques. (L3)

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 **11 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)

UNIT-IV **9 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:

1. At the end of the unit, the student will be able to
2. Define Structures and Build C programs using Structures. (L3)
3. Explain Complex Data Structures. (L2)
4. 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:

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

ENGINEERING PHYSICS LAB

I Year B. Tech. I semester

[CSE(AI&ML)]

Course Code: 24BP11RC02

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the course the student will be able to

CO1: Interpret the physical parameters based on optical phenomena. (L2)

CO2: Verify the behaviour of double refraction in birefringent material like quartz. (L2)

CO3: Demonstrate the concepts of diffraction through experiments. (L3)

CO4: Calibrate instruments like low range voltmeters and ammeters. (L3)

CO5: Design temperature sensors based on diodes and thermistors. (L3)

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.

Textbooks:

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

COMPUTER ENGINEERING WORKSHOP

I Year B. Tech. I semester
[Common to CSE, CSE (AI&ML), IT]

Course Code: 24CT11RC03

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to:

CO1: Identify the peripherals of a computer. (L3)

CO2: Demonstrate the installation process of operating systems like MS Windows, LINUX. (L3)

CO3: Make use of MS-Office suite that comprises of various applications to create documents, organizes & analyses data and captivating presentations. (L3)

CO4: Categorize various UNIX/LINUX Commands to work on a modern operating system. (L3)

CO5: Experiment with GIT Commands and make use of LaTeX to prepare research articles. (L3)

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/

PROBLEM SOLVING USING C LAB

I Year B. Tech. I semester

[Common to CSE, CSE (AI&ML), IT, ECE]

Course Code: 24CT11RC04

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to:

CO1: Outline the use of basic constructs of C for simple applications. (L2)

CO2: Develop C programs for simple applications using Arrays and Strings. (L3)

CO3: Illustrate concepts such as functions, recursion, and pointers with suitable examples. (L2)

CO4: Build C programs involving Structures and Unions. (L3)

CO5: Develop applications using sequential and random-access file processing. (L3)

Module-1:

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:

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:

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:

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:

1. Write a C program to demonstrate user defined functions.
2. Write a C program to demonstrate nested functions.

Module-6:

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:

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:

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.

Module-9:

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:

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

LINEAR ALGEBRA AND VECTOR CALCULUS

I Year B. Tech. II Semester

[Common to EEE, ECE, CSE, IT, CSE (AI&ML)]

Course Code: 24BM11RC02

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 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: **10 Lectures**

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 Textbook]

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 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: **10 Lectures**

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 Textbook]

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: **9 Lectures**

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 Textbook]

Learning Outcomes:

At the end of the unit, the student will be able to

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 **9 Lectures**

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 **10 Lectures**

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 theoremswithout 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)

Textbooks:

1. 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

GREEN CHEMISTRY

I Year B. Tech. II semester
[Common to CSE (AI&ML), ECE]

L	T	P	C
3	0	0	3

Course Code: 24BC11RC01

Course Outcomes: At the end of the Course, the student shall be able to

CO1: To develop knowledge about water and its treatment for industrial and potable purpose. (L3)

CO2: Utilize the theory of construction and discharge reactions of various types of batteries are used in commercial society. (L3)

CO3: Explain the importance of working principle, fabrication of electrodes and other components, advantages, disadvantages and environmental aspects of fuel cells. (L4)

CO4: Classify the corrosion mechanism of metals and factors influenced by rate and extent of corrosion and categorize the reasons for corrosion control methods. (L4)

CO5: Apply green chemistry technology processes the knowledge for solving existing challenges faced in various engineering and societal areas. (L5)

UNIT-I **10 Lectures**

Water-Technology: 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. [TB1: Chapter1]

Learning Outcomes:

At the end of the unit the student will be able to

1. Explain the principles of reverse osmosis (L4)
2. Compare the quality of drinking water with BIS and WHO standards (L4)
3. Illustrate problems associated with Boiler Troubles (L2)
4. Demonstrate the estimation of hardness of water (L3)

UNIT-II **10 Lectures**

Batteries: 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: Lead acid and VRLA (valve regulated (sealed) lead acid), nickel cadmium, nickel-zinc, nickel- metal hydride batteries, lithium-ion batteries, ultrathin lithium polymer cells. Advanced Batteries for electric vehicles, requirements of the battery – sodium-beta and redox batteries. [TB1: Chapter6]

Learning Outcomes:

At the end of the unit, the student will be able to

1. Deduct the working mechanism of various types of cells (L5)
2. Illustrate difference between primary and secondary cells (L2)
3. List the environmental applications of Various types of batteries (L4)
4. Utilize the manufacturing methods of advanced batteries for electric vehicles (L3)

UNIT-III **8 Lectures**

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. [TB1: Chapter 6]

Learning Outcomes:

At the end of the unit, the student will be able to

1. Explain the fundamental theories of fuel cells (L2)
2. Classify types of fuel cells (L4)
3. Make use of the various components fabrication of fuel cells (L3)
4. Distinguish the advantages, disadvantages and environmental aspects of fuel cells(L4)

UNIT-IV **10 Lectures**

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. [TB1: Chapter 7]

Learning Outcomes:

At the end of the unit, the student will be able to

1. Explain the Mechanism of corrosion (L4)
2. List the various types of Corrosion (L4)

3. Describe the Factors Effecting Corrosion (L5)
4. Differentiate between Paints Lacquers Enamels (L4)

UNIT-V **10 Lectures**

Green-Chemistry and Technology: 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 functional group, optimization of frameworks for the design of greener synthetic pathways -Green synthesis of Adipic acid and Paracetamol- energy minimization-Microwave synthesis, ultra sound assisted method Bio catalyzed reaction and Only explanation with examples Processes involving solid catalysts – zeolites, ion exchange resins, applications of Green Chemistry, Green solvents, green fuels & propellants. [TB2: Chapter- 2,3,4&5]

Learning Outcomes:

At the end of the unit the student will be able to

1. Processes involving Green Chemistry and apply the knowledge for solving existing
2. Challenges faced in various engineering and societal areas (L-5)
3. Differentiate between functional toxicity vs non- functional toxicity (L-4)
4. Explain the green chemistry, 12 principles (L-2)

Textbooks:

1. Engineering Chemistry – PC Jain and M. Jain –15th Edition, 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 Textbook of Engineering Chemistry – S. S. Dara – S. Chand & Co. New Delhi
3. Handbook 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

ENGLISH

I Year B. Tech II Semester

[Common to ECE, EEE & CSE(AI&ML)]

L	T	P	C
3	0	0	3

Course Code: 24HE11RC01

Course Outcomes: At the end of the Course, the student shall be able to

CO1: Develop moral values and inner peace(L3), Demonstrate the use of LSRW skills, Vocabulary and basic grammar concepts. (L3)

CO2: Identify the impact of different social backgrounds (L3), recognize the poet's insights. (L4) Demonstrate the use of LSRW skills, Vocabulary and basic grammar concepts. (L3)

CO3: Analyse socio-cultural context(L4), Establish effective interpersonal and communication skills(L3), Demonstrate the use of LSRW skills, Vocabulary and basic grammar concepts(L3)

CO4: Focus on value of education(L4), Relate to the poet's nostalgia(L4), Demonstrate the use of LSRW skills, Vocabulary and basic grammar concepts (L3)

CO5: Determine the central idea of the text(L3), Identify one's resilience(L3), Demonstrate the use of LSRW skills, Vocabulary and basic grammar concepts (L3)

UNIT-I **10 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. Interpret the spiritual growth and capacity building of the individual in the 21st century. (L3)
2. Use appropriate synonyms and antonyms to communicate effectively. (L3)
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 organization of written text (L3)

UNIT-II **10 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. Relate to the world through adult & child's points of view (L3)
2. Identify the sense of self dignity & rationality in the poem (L4)
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. Write formal letters(L3)

UNIT-III **10 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. Analyze strategies to face challenges in life (L4)
2. Develop one's own personality (L3)
3. Use idiomatic expressions in oral & written communication (L3)
4. Listen & Interpret the audio for Global Comprehension (L3)
5. Ask & provide information (L3)
6. Practice note making study skills(L3)

UNIT-IV **10 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. Prioritize the habits of continuous learning(L4)
2. Recognize the significance of Indian philosophy (L4)
3. Identify and correct common errors in English grammar and usage(L3)
4. Draw inferences from the audio(L3)
5. Articulate one's own opinions(L3)
6. Develop different types of essays (DEAN)(L3)

UNIT-V **8 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. Show resilience in adverse situations. (L3)
3. Modify sentences with appropriate grammar, vocabulary and usage (L3)
4. Identify key ideas (L3)
5. Practice telephone Etiquette (L3)
6. Apply the knowledge of E-mail Etiquette (L3)

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

DIGITAL LOGIC DESIGN

I Year B. Tech. II semester

[Common to ECE, CSE, CSE(AI&ML), IT]

Course Code: 24EC11RC05

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 **9 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. [Textbook1: 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. [Textbook1: Chapter 2: Sections 2.11 to 2.19,2.21,2.22,2.23, Chapter 3: sections 3.2 to 3.6,3.7]

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 circuits. (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 **12 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. [Textbook1: 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 **10 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. [Textbook1: 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 **7 Lectures**

Analysis and Design of Synchronous Sequential Machines: Moore and Mealy machine models, State Equations, State Table, State diagram, State reduction & assignment, Synthesis of synchronous sequential circuits- sequence detector and generator. [Textbook1: Chapter 7 Sections 7.1 to 7.5]

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)

Textbooks:

1. 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)

PYTHON PROGRAMMING

I Year B. Tech. II Semester

[Common to CSE, IT, CSE (AI&ML)]

Course Code: 24CT11RC06

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 historical development, necessity, applications, and basic concepts of python programming. (L2)

CO2: Identify and implement appropriate control structures to solve a particular programming problem. (L3)

CO3: Examine various data structures and apply to solve real world problems. (L3)

CO4: Build simple functions and packages used in python for solving real world problems. (L3)

CO5: Outline Object Oriented concepts in python and illustrate Exception handling. (L2)

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 **10 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.

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 **10 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]

Textbooks:

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/

COMMUNICATION SKILLS LAB

I Year B. Tech. II Semester

[Common to ECE, EEE, CSE (AI&ML)]

Course Code: 24HE11RC02

L	T	P	C
0	0	3	1.5

Course Outcomes: At the end of the Course, the student shall be able to

CO1: Identify and pronounce the sounds of English; choose the accurate stress in connected speech for proper intonation. (L3)

CO2: Apply the main theme and ideas of the audio/video to take notes and summarize. (L3)

CO3: Develop speaking skills by taking part in Just A Minute (JAM) – Picture Prompts-Narratives-Role Play. (L3)

CO4: Practice discussions and debates. (L3)

CO5: Demonstrate Presentation Skills. (L3)

ACTIVITY-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 knowledge of Phonetics for better pronunciation and articulation. (L3)
2. Choose appropriate stress, intonation and rhythm of English language for clear communication. (L3)

ACTIVITY-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. (L3).
2. Apply effective strategies for good writing. (L3)
3. Demonstrate writing skills in note taking and summarizing. (L3)

ACTIVITY-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. Practice speaking skills through participation in activities such as narrating stories and role plays(L3)

ACTIVITY-IV

Speaking skills: Group Discussions-Arguments-Debates

Learning Outcomes:

At the end of the unit, the student will be able to

1. Organize one's own ideas for various Group-Discussion formats. (L3)
2. Develop ideas and arguments to debate. (L3)

ACTIVITY-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. Apply appropriate body language (postures, gestures, facial expressions and eye contact) in formal presentations. (L3)

LIST OF LAB ACTIVITIES:

1. Identification and pronunciation of Vowel sounds and Consonant sounds (CO1)
2. Identification of word stress, Intonation and Rhythm (CO1)
3. Listening for specific information & Note taking (CO2)
4. Listening to the speeches of eminent personalities and summarizing (CO2)
5. Just A Minute sessions (CO3)
6. Picture Prompts (CO3)
7. Narrating Stories& anecdotes (CO3)
8. Role-Plays (CO3)
9. Group Discussions (CO4)
10. Debates (CO4)
11. Presentation Skills-I (CO5)
12. Presentation Skills-II (CO5)

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.

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

PYTHON PROGRAMMING LAB

I Year B. Tech. II semester

[Common to CSE, CSE (AI&ML), IT]

Course Code: 24CT11RC07

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 core programming basics and various Operators of Python. (L2)

CO2: Implement programs using conditional statements and loops and strings. (L3)

CO3: Develop functions and strings to perform simple tasks. (L3)

CO4: Make use of various data structures like lists, tuples, sets and dictionaries. (L3)

CO5: Implement Python programs with files, Classes and objects. (L3)

Module-1: Basics of Python

1. Write a program to display the statements.
2. Demonstrate about fundamental Data types in Python Programming. (i.e., int, float, complex, bool and string types)
3. Write a Python program to demonstrate various type conversion functions.
4. Write a program to demonstrate the inbuilt Math function

Module-2: Operators in Python

1. 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

1. Write a program to check whether the given number is even or odd
2. Write a program to read marks of a student and display the corresponding grade
3. Write a program to find the largest element among the given numbers (multi-way if-elif-else statements.)

Module-4: Looping/Iterative Statements

1. 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:

2. Demonstrate the following control transfer statements in Python with suitable examples.
   i. break ii. continue iii. Pass

Module-5: Functions

1. Write a function to find the multiplication of two numbers and demonstrate the usage of parameters and arguments of a function.
2. Write a program to define a function using default arguments.
3. Demonstrate lambda functions in Python with suitable example programs.

Module-6: Strings

1. 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).
   v. Searching for keywords. vi. Replacing certain words.
   vii. Formatting feedback for display. viii. Summarizing feedback.

Module-7: Lists:

1. Write a program to create a list and perform the following operations:
   i. + ii. * iii. slicing iv. del
2. 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)
3. 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.
4. 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.
5. Write a program to calculate the length of each element in a list using map function in python.

Module-8: Tuples

1. 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)].
2. Write a program to create n iterables of varied sizes and group the values using zip function in python.
3. 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.

4. 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
5. 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.
6. 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

1. Write a program to create two sets and perform the following operations:

i. Union ii. Intersection iii. Difference iv. Asymmetric Difference

2. Write a program to generate a dictionary that contains numbers (between 1 and n) in the form of (x,x*x).
3. Write a program to implement a shopping cart where you can add items with their prices and quantities, and then calculate the total cost.
4. 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

1. 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.
2. Write a program to read 3 subject marks and display pass or failed using class and object.

Module-11: Files

1. Write a program to copy the contents of a file to another file.
2. 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

WEB TECHNOLOGIES LAB

I Year B. Tech. II semester

[Common to CSE, CSE (AI&ML), IT]

Course Code: 24CT11RC08

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 professional web pages for an application using HTML elements like lists, navigations, tables, various form elements, and embedded media, including images, audio, and video. (L3)

CO2: Build inline, internal, and external CSS to enhance the visual presentation of web pages, including layout, fonts, colors, and backgrounds. (L3)

CO3: Utilize JavaScript to develop interactive HTML web pages and validate form data. (L3)

CO4: Apply JavaScript functions and events to enhance user interaction and provide a dynamic user experience. (L3)

CO5: Experiment with XML files to store and display structured data and write a DTD to perform well-formed and validated XML documents. (L3)

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.

1. **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 bookstore website. The page should include:

   iii. Audio Element: An audio player to play background music or a podcast.

   iv. Video Element: A video player to display a promotional video about the bookstore.

v. Iframe Element: An iframe to embed a Google Maps location of the bookstore.

2. **LOGIN PAGE**
3. **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.
4. **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).

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:

1. Input: Click on the Display Date button using onclick( ) function

   Output: Display the date in the textbox.
2. Input: A number n obtained using prompt

   Output: Factorial of n number using alert.
3. Input: A number n obtained using prompt

   Output: A multiplication table of numbers from 1 to 10 of n using alert.
4. 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.

1. First Name (Name should contain alphabets and the length should not be less than 6 characters).
2. Password (Password should not be less than 6 characters in length).
3. E-mail ID (should not contain any invalid and must follow the standard pattern name@domain.com)
4. Mobile Number (The phone number should contain 10 digits only).

5. 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:

1. Create a class 'Person' with attributes 'name' and 'age' and add a constructor to initialize these values.
2. 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 bookstore. 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 application mentioned below.

Note: A report has to be submitted by every student at the end of the semester, including design, coding, output, etc.

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)