Gayatri Vidya Parishad College of Engineering for Women
Madhurawada, Visakhapatnam
(Affiliated to JNTUK, Approved by AICTE, New Delhi)

Department of Information Technology

B.Tech(IT) Course Outcomes(R16)

1st Semester

Course Code	Course Title	Course Outcomes	
C111	English – I	CO1	Develop an understanding of the service that can be rendered through the human resources to the society and acquire knowledge of familial relationships portrayed in "An Ideal Family".
		CO2	Develop awareness and importance of road safety and relate the pain and hopelessness that war brings in the lives of ordinary people.
		CO3	Evaluate and to perceive the advantages and disadvantages of technology and show that courage and determination can triumph all obstacles.
		CO4	Plan alternatives to the depleting sources and to choose suitable sources of energy for rural India and distinguish between reality and illusion, to overcome the superstious beliefs.
		CO5	Build on the fact that the animal must be preserved because animal life is precious and analyze the tragedy that unplanned development can ensue.
		CO6	Apply safety measures at home, workplace, labs, industries by following safety measures and evaluate the complex issue prevails in racism and slavery.
C112	Mathematics - I	CO1	Solve the first order, first degree differential equations and apply the techniques to engineering applications.
		CO2	Solve the higher order differential equations with constant coefficients and apply it to solve physical situations whose behavior can be described by Linear D.E.
		CO3	Determine Laplace Transforms of various functions and apply it to solve linear ODE with initial conditions.
		CO4	Utilize multivariate differential calculus concepts to determine the extrema of multivariable functions.
		CO5	Solve the linear and nonlinear partial differential equations of first order.

		CO6	Classify and solve the higher order linear/non-linear partial differential equations with constant coefficients.
C113	Mathematics – II (Mathematical Methods)	CO1	Solve algebraic, transcendental and simultaneous equations using numerical methods like Bisection, False-Position, Iterative and Newton Raphson method.
		CO2	Construct an interpolating polynomial for the given data and estimate the value of an unknown function at a given point using Newton forward, backward, Gauss forward, backward and Lagrange interpolation formulae.
		CO3	Evaluate definite integrals using Quadrature formula, and solve the ordinary differential equations numerically using Taylor, Picard, Euler's and RK methods.
		CO4	Find Fourier Series of an arbitrary function over a given range.
		CO5	Utilize the method of separation of variables to One dimensional wave, heat and two dimensional Laplace equations.
		CO6	Determine the Fourier Transform, sine, cosine transforms and their Inverse Fourier transforms of given function and evaluates integrals using Fourier integral theorem.
C114	Applied Physics	CO1	Utilize the concepts of interference of light in understanding the optical systems and apply the principle in observing the formation of interference pattern in thin films.
		CO2	Distinguish the different types and understand the resolving power of optical instruments through various slit pattern effects of diffraction.
		CO3	Understand the concepts of polarization types and conversion by studying wave plates and polarimeter and further understand working principle of lasers.
		CO4	Understand the basic principles of electromagnetic fields that predict the possibility of electromagnetic waves.
		CO5	Explain and apply the fundamentals of quantum mechanics to a particle in one dimensional potential box and to study the conductivity of free electrons in solids.
		CO6	Infer the mechanism of electrical conduction in solids, especially the semiconductors which are the basic materials for electronic devices.
C115	Computer Programming Using C	CO1	Understand the background of programming languages and computing environments.
		CO2	Make use of basic C- programming language constructs to build C-programs.

		CO3	Develop C-programs by utilizing various control structures.
		CO4	Classify modular programming techniques to implement C-programs.
		CO5	Build C-programs by using data structures like arrays, strings.
		CO6	Make use of pointers, structures and files to build c programs which are useful for real time development.
C116	Engineering Drawing	CO1	Make use of graphic representation as per standards and to construct polygons, ellipse and scales.
		CO2	Identify and draw the orthographic projection of points & straight lines placed in various quadrants
		CO3	Identify and draw the projection of straight lines inclined to both the planes
		CO4	Identify and draw the projection of planes inclined to both the planes.
		CO5	Plan and draw the projection of solids in different positions & inclined to one of the planes.
		CO6	Interpret orthographic and isometric views of objects.

Laboratory Courses

Course Code	Course Title	Experiment No	CO.No.	Course Outcomes
C117	English-Communication Skills Laboratory – I	1,2	CO1	Apply the skill of making inquiries over phone, thanking and responding to thanks.
		3,4	CO2	Develop responding to requests, requesting, asking permission, giving and refusing permission, asking direction and giving direction.
		5,6	CO3	Make use of language skills in inviting, accepting and declining invitations, congratulating, making and responding to complaints.
		7,8	CO4	Identify the relationship between letters and sounds.
		9,10	CO5	Develop pronunciation, stress and intonation while speaking.
C118	Applied /Engineering Physics Laboratory	4,5	CO1	Determine the elastic modulus of given material and Moments of inertia of various types of pendulums.
		1,2,3	CO2	Operate optical instruments (Spectrometer and travelling microscope) to understand principles of interference and diffraction of light.
		6	CO3	Understand the modes of mechanical vibrations and determine their frequency.
		13	CO4	Apply tangent law to study the variation of magnetic fields due to current carrying conductors.

		10,11, 12,14	CO5	Estimate the Energy band gap, thermal coefficients of resistance for semiconductors and understand the volt -ampere characteristics of diodes.
C119	Applied/ Engineering Physics – Virtual Labs-Assignments	-	CO1	Inculcate basic scientific concepts through a virtual studying and learning environment within short duration of time
		-	CO2	Execute experiments through simulations which are difficult to do in the real laboratories either because of their risk and/or high cost of the equipment
		-	CO3	Develop skills for technical documentation as well as exploration for any project/research which they do at later stages
C1110	C Programming Laboratory	1,2	CO1	Make use of basic C-programming language constructs and practice logical ability to solve problems in Linux Environment.
		3,4,5, 6,7	CO2	Solve problems by using control structures and modularity.
		8,9,12	CO3	Build programs using basic data structures include arrays, strings and structures.
		10,11	CO4	Apply pointers and dynamic memory allocation for dealing real world problems.
		13,14, 15,16	CO5	Utilize files for developing C-programs and understand the basic concepts of Computer Hardware and software.

2nd Semester

Course Code	Course Title	Course Outcomes	
C121	English – II	CO1	Make use of the greatest resource, education and follow Dr.A.P.J's simple life and service to the nation. Develop the skill of writing official letters.
		CO2	Develop peaceful co-existence and universal harmony and have deep insight on the achievements of Sir C.V.Raman. Apply e-correspondence in professional field.
		CO3	Analyze the symptoms of cultural shock and aftermath consequences due to globalization and assimilate the contributions of H.J.Bhabha. Plan speech writing.

		CO4	Assess the theme which the society needs to re-examine its traditions when they are outdated and acquire the knowledge of discoveries and inventions made by J.CBose. Understand the structure of the text.
		CO5	Categorize several health disorders due to climatic change and recommend protective environment for the sustainability of the future generations and develop insight into the contributions of P.C.Ray. Make use of technical writing for the media.
		CO6	Relate eminent personalities, who toiled for the present day advancement in software field and perceive Ramanujan innate talent. Develop report writing skills.
C122	Mathematics – III	CO1	Determine the rank of a matrix and Solve linear system of equations using Rank and iterative methods
		CO2	Determine Eigen values and Eigen vectors of a matrix and apply the concept to examine the nature of quadratic forms
		CO3	Explain the concepts of curve tracing, double and triple integrals and apply them to determine areas and volumes.
		CO4	Examine the properties of Beta and Gamma functions and apply them to solve improper integrals.
		CO5	Apply vector differential operator on scalar and vector point functions and determine directional derivative, angle between two surfaces.
		CO6	Determine the work done using Line Integrals and evaluate line, surface and volume integrals using Green's Theorem, Stoke's Theorem and Gauss Divergence theorem.
C123	Applied Chemistry	CO1	Understand the preparation, properties, advantages and limitations of plastic materials and relate the ideas to engineering applications
		CO2	Compare and relate the advantages, limitations of different fuels with the computational air requirements for combustion
		CO3	Make use of electrochemical reactions in understanding the construction and working of batteries and further gain knowledge of corrosion

			control
		CO4	Utilize fundamentals of applied chemistry to acquire knowledge of advanced materials and their applications
		CO5	Apply the basics of solid state chemistry in understanding the structure and properties of crystalline solids
		CO6	Gain knowledge regarding non-conventional energy sources and compare their advantages and limitations
C124	Object Oriented Programming through C++	CO1	Compare the conventional programming language with Object Oriented Programming language and outline the key concepts of OOP
		CO2	Make use of C++ Programming constructs and classes, objects, function overloading and constructors
		CO3	Develop Object Oriented Programming using operator overloading, type conversion and Simplify the code using inheritance with code reusability
		CO4	Experiment with the pointer concepts, polymorphism and virtual functions
		CO5	Utilize templates for generic programming and Examine the raised exceptions using exception handling
		CO6	Outline the STL programming model, Make Use of the various containers and associated algorithms
C125	Environmental Studies	CO1	Outline global environmental challenges, initiatives towards sustainable development, understand the concept of the ecosystem and its importance
		CO2	Demonstrate an understanding about natural resources and recognize the need to conserve them
		CO3	Explain biodiversity, identify threats to biodiversity and the conservation methods
		CO4	Categorize and explain different types pollution, their causes, impacts, control measures and waste management practices
		CO5	Identify social issues pertaining to environment and gain knowledge about various environmental legislations
		CO6	Examine and understand the concept of environmental impact assessment, environmental audit and its importance
C126	Engineering Mechanics	CO1	Understand the concepts of moment, friction and its

			applications
		CO2	Analyze the given physical problem for finding the unknown reaction forces by using equilibrium equations & graphical method
		CO3	Determine the centroid and center of gravity of the given plane area and solid body
		CO4	Estimate area and mass moment of inertia of a plane area and solid body
		CO5	Evaluate the displacement, velocity and acceleration of a particle subjected to rectilinear and curvilinear motion & methods of representing plane motion
		CO6	Apply work energy principle, impulse momentum principle for connected systems

Laboratory Courses

Course Code	Course Title	Experiment No	CO.No.	Course Outcomes
C127	Applied/ Engineering Chemistry Laboratory	2&3	CO1	Make use of experimental skills for volumetric titrations and perform acid - base titrations using indicators
		4, & 16	CO2	Demonstrate an understanding of redox titrations like permanganometry and estimation of vitamin c in different samples
		7,8 &15	CO3	Apply the principles of complexometric titrations to determine hardness of water, amount of Zinc and Copper using EDTA in the given samples
		9,10,11,12,13,&14	CO4	Perform Experiments with instruments such as conductometer, pH meter to acquire skills of conductometric titrations and chemical analysis
		5 &6	CO5	Estimate the amount of Ferrous Iron in the sample using Potassium Dichromate using the principles of oxidation - reduction titration
C128	English-Communication Skills Laboratory - II	1,2	CO1	Build the basics of debating, presenting their views, arguing and counter arguing.
		3,4	CO2	Plan and prepare for a Group Discussion
		5,6	CO3	Organize and structure the content of a presentation.
		7,8	CO4	Make use of C.V for interviews, face interviews confidently and develop official emails.
		9,10	CO5	Apply idiomatic expressions in usage and avoid common errors in English.

C129	Object Oriented Programming Lab	1,2	CO1	Explain g++ compiler and translate basic c programs into c++ programs
		3,4,5, 8	CO2	Develop programs using different operators like scope access, new, delete and utilize different function concepts like inline, friend, function overloading and operator overloading
		6,7	CO3	Construct programs on classes, objects, constructors and Make use of access specifies in classes
		9,10,1 1	CO4	Utilize inheritance and polymorphism features to implement code reusability
		12,13 14,15	CO5	Apply exception handling concepts to handle runtime errors and Make use of templates ,STL concepts to implement generic programming

3rd Semester

Course Code	Course Title	Course Outcomes	
C211	Statistics with R Programming	CO1	List motivation for learning R programming language and make use of different types of data structures in R.
		CO2	Identify and implement appropriate control structures to solve a particular programming problem and also import new function packages into the R workspace.
		CO3	Examine numerical statistics used in introductory statistics, manipulate and summarize data-sets in R.
		CO4	Build simple plots by using introductory statistics for data visualization.
		CO5	Make use of data-sets to create testable hypotheses and identify appropriate statistical tests.
		CO6	Outline the usage of linear and non-linear models in R.
C212	Mathematical Foundations of Computer Science	CO1	Make use of propositional, predicate logic and truth tables to verify the validity of logical flow of arguments
		CO2	Analyze sets, relations and functions
		CO3	Demonstrate Number Theory and Mathematical Induction
		CO4	Apply knowledge of Binomial Theorem, Permutations, Combinations associated operations in problem solving
		CO5	Construct generating functions, recurrence relations; solve recurrence relations
		CO6	Construct graphs, trees and also determine spanning tree of a given graph using DFS / BFS, minimal spanning tree of a given graph.
C213		CO1	Represent number systems and perform binary arithmetic's

	Digital Logic Design	CO2	Make use of Boolean Algebra to minimize logic functions
		CO3	Apply the concepts of K map to minimize logic functions.
		CO4	Model combinational logic circuits using basic gates and HDL.
		CO5	Develop minimized FSMs by using the concepts of sequential circuits.
		CO6	Construct registers and counters by using flip-flops.
C214	Python Programming	CO1	Outline the need for learning Python programming language and basic programming constructs.
		CO2	Identify and implement appropriate control structures to solve programming problem.
		CO3	Apply various data structures in developing solutions to real time scenarios.
		CO4	Build functions and make use of packages for solving real world problems
		CO5	Analyze object oriented concepts in python and Outline Exception handling concepts.
		CO6	Summarize the usage of pattern matching, GUI and other system packages in python.
C215	DS Through C++	CO1	Relate the concept of Abstract Data Type using classes and Build Polynomials, Sparse Matrix ADT.
		CO2	Apply data structures like stacks and queues to Solve various real time computing problems.
		CO3	Develop programs using linear data structures to Solve real world problems.
		CO4	Develop various non-linear data structures like trees to solve various computing problems.
		CO5	Apply various non-linear data structures like graphs to solve various computing problems.
		CO6	Make use of various sorting techniques on unsorted Data.
C216	Software Engineering	CO1	Classify various Software Engineering Methods and Software Process Models.
		CO2	Summarize the requirements analysis to organize SRS documents and demonstrate the software design approaches.
		CO3	Apply various software design models on function, object oriented analysis, and interfaces.
		CO4	Illustrate coding and different software testing approaches.
		CO5	Classify capability maturity model and make use of CASE tools on software to ensure quality.
		CO6	Summarize maintenance process models and reuse

			approaches.

Laboratory Subjects

Course Code	Course Title	Experiment No	Course Outcomes	
C217	DS Through C++ Lab	3,4	CO1	Develop programs on Stack ADT and Queue ADT.
		1,2	CO2	Construct C++ programs on Linear Data Structures like Single Linked List and Double Linked List Operations.
		5,6,7,15	CO3	Build C++ programs on nonlinear Data Structures like Heaps, Binary Search Trees.
		8,9,10,11,12	CO4	Make use of Graphs to Develop C++ programs to like Graphs Traversal Algorithms, Minimum Spanning tree Algorithm.
		13,14	CO5	Develop C++ programs for several recursive non recursive Sorting Techniques.
C218	Python Programming Lab	1,2,3,4	CO1	Apply control structures and operators for writing basic python programs.
		5,6,11	CO2	List various python data structure concepts and apply them to solve real world problems.
		7,8,9,10	CO3	Develop functions and examine various file handling techniques and apply them to solve real world problems.
		12	CO4	Build simple Modules used for solving real world problems.
		13,14,15,16	CO5	Analyze object oriented concepts in python and develop, test various GUI applications.

4th Semester

Course Code	Course Title	Course Outcomes	
C221	Computer Graphics	CO1	Show the importance of various primitive algorithms, Clipping algorithms, and Geometric Transformations on various 2D objects.
		CO2	Classify different types of Projections, Extend the concepts of geometric transformations to 3D, 3D viewing, curves, surfaces and hidden surface removal algorithms
		CO3	Outline various Color models, General Computer Animation and Experiment with different openGL operations on 2D objects.
		CO4	Summarize the concepts of Shading models, textures, shadows on objects to get realistic appearance and build a camera using openGL .
		CO5	Show the generations of various self-similarity curves and

			Explain Iterated function Systems, Mandelbrot sets and Julia sets.
		CO6	Explain Ray tracing, Surface textures, Reflections and transparency to the objects.
C222	Java Programming	CO1	Compare and contrast between Object Oriented Programming & Procedural Oriented Programming by building, compiling and testing with sample java programs.
		CO2	Develop java programs using control structures, arrays to solve real world problems.
		CO3	Solve real world problems using object oriented constructs such as inheritance, interfaces and exception handling concepts.
		CO4	Make use of multithreaded programming in java and file operations by using classes in java.io package.
		CO5	Build dynamic user interfaces using applets and event handling.
		CO6	Distinguish between AWT and Swing components by developing a GUI using those components.
C223	E-Commerce	CO1	Outline the anatomy and category of e-commerce applications and mercantile process models.
		CO2	Classify various electronic payment systems and illustrate electronic data interchange in inter organizational e-Commerce.
		CO3	Organize the workflow automation, coordination and utilize macro forces in Intra Organizational E-Commerce.
		CO4	Build a business case for document library, creation of data warehouses and apply information based marketing in businesses for case studies.
		CO5	Summarize search and discovery paradigms, e-commerce catalogs and directories and information filtering.
		CO6	Outline key multimedia concepts, digital video and electronic commerce and desktop video conferencing.
C224	Computer Organization	CO1	Summarize the Functional Units of a Computer, Bus Structures, System Software and Analyze the Performance

			of a Computer using different parameters
		CO2	Summarize Register Transfer Notation, Assembly Language Notation and Apply the knowledge of Stacks to sub-routine nesting in Computer Program Execution.
		CO3	Outline Arithmetic, Logic, and Branch Instructions and Apply the knowledge of Addressing Modes to identify Effective Address of an operand.
		CO4	Make Use Of Interrupt Handling and DMA in multiple devices.
		CO5	Classify various Memory Circuits and Apply the concept of Mapping Techniques to identify the Address in Cache Memory.
		CO6	Outline the process of storing positive/negative numbers and performing Arithmetic Operations, Hardwired and Micro-Programmed Control.
C225	OOAD using UML	CO1	Compare structure oriented with object –oriented approaches to solve complex problems and frame solutions
		CO2	Identify classes and objects through classification approaches
		CO3	Make use of basic UML constructs and develop class and object diagram.
		CO4	Identify interaction and use cases, model the use case diagram, interaction diagram, and activity diagram.
		CO5	Make use of behavioral modeling concepts to build state chart diagram.
		CO6	Build component and deployment diagrams with Architectural modeling concepts.ms.
C226	Principles of Programming Languages	CO1	Summarize Syntax and Semantics of different programming languages
		CO2	Outline the concepts of Variables, Data types, Expressions and Control Statements of Programming languages
		CO3	Interpret pros and cons of Subprograms/subroutines and analyze subprograms associated with various programming

			languages
		CO4	Outline Object Oriented, Concurrency and Event Handling programming constructs
		CO5	Relate Functional programming languages with Imperative languages and construct programs in SCHEME and ML
		CO6	Develop programs in PROLOG and inspect different multi-paradigm languages

Laboratory Subjects

Course Code	Course Title	Experiment No	Course Outcomes	
C227	Unified Modeling Languages Lab	WEEK-1,2,3,4	CO1	Construct UML diagrams for static view of the system and develop Event table and CRUD Matrix.
		WEEK-7,8,9,10	CO2	Make use of GRASP patterns to refine models for the given scenario.
		WEEK-7,8,9,10	CO3	Build three layer package diagrams for the given case studies.
		WEEK-11,12	CO4	Develop design solutions using various design patterns.
		WEEK-5,6,13	CO5	Construct UML diagrams for use-case view and dynamic view of the system.
C228	Java Programming Lab	1,2	CO1	Develop Java applications using command line arguments, arrays and control structures.
		2(d)	CO2	Explain the usage of strings in Java by developing suitable applications.
		3,4,5,6,8,12	CO3	Solve real world problems using OOPs concepts.
		7,9	CO4	Build Java applications by handling exceptions.
		10,11,13,14,15,16	CO5	Construct concurrent applications by applying Multithreading, AWT concepts in java

5th Semester

Course Code	Course Title	Course Outcomes	
C311	Human Computer Interaction	CO1	Interpret the various concepts of human interaction with computers using various devices and processes.
		CO2	Outline typical Human-Computer Interaction (HCI) Models, styles and various historic HCI paradigms with real time examples.
		CO3	Extend the knowledge of HCI design principles, standards and guidelines to achieve good quality of service for interfaces.
		CO4	Examine principles of screen design and windows interface
		CO5	Categorize tasks of relevant HCI systems based on task analysis and specify various interaction devices.
		CO6	Identify documentation design issues for user assistance in HCI systems.
C312	UNIX &Shell Programming	CO1	Summarize the history of UNIX operating system, UNIX components and Demonstrate basic UNIX commands.
		CO2	Make use of UNIX file system hierarchy and architecture to experiment with file utility commands like chmod, chgrp, chown.
		CO3	Develop new commands using command line arguments, shell variables and I/O redirection.
		CO4	Make use of grep, awk, SED stream editors for file processing.
		CO5	Develop shell script by analyzing shell programming constructs.
		CO6	Illustrate about child and parent process, internal and external commands.
C313	Advanced Java	CO1	Summarize HTML and outline the java Swing package,

	Programming		collections framework
		CO2	Illustrate Java Beans with bean introspection, bound and constrained properties, persistence and customizers.
		CO3	Make use of the javax.servlet package, servlet life cycle and build web application using servlets to implement http request responses, cookies and session tracking.
		CO4	Outline the anatomy of JSP Page and MVC Architecture and demonstrate installing of tomcat server and setting up JSP Environment.
		CO5	Build web application using JSP to implement dynamic content generation, implicit objects, directives, error handling, sharing of data between pages and sharing session and application data
		CO6	Apply java.sql package and build jsp code to demonstrate access to MySql or MS Access Databases and perform database specific actions
C314	Data Base Management Systems	CO1	Outline the architecture of DBMS and provide the knowledge on levels of abstraction
		CO2	Construct the E-R model to represent databases and write expressions in relational algebra, tuple and domain relational calculus to represent queries on real world problems
		CO3	Experiment with queries and nested queries on real world problems by using several operators like join, set, and aggregate.
		CO4	Relate and Plan the concept of data planning and database design using normalization
		CO5	Utilize the ACID properties in transaction management and interpret concurrency control mechanisms
		CO6	Categorize various file organizations and indexing for faster retrieval of data, persistent storage of data
C315	Operating Systems	CO1	Summarize structures, functions of operating systems and system calls.
		CO2	Outline various process management, multithreading concepts and make use of CPU scheduling algorithms in

			multiprogramming.
		CO3	Summarize Memory Management concepts and Apply various Page Replacement Algorithms to manage the memory efficiently
		CO4	Outline various Process synchronization concepts, Identify the causes and effects of deadlocks in Operating system.
		CO5	Make use of File System Interface, File System Implementation and Mass Storage Structure.
		CO6	Examine Linux, Android operating systems with general operating systems principles
C319	Professional Ethics & Human Values	CO1	Apply the moral template inculcating the core human values for transformation into an ethical human being
		CO2	Utilize the principles of harmony, value education and human virtues for professional competency
		CO3	Explain and understand the role of engineering ethics and code of conduct for development of professionalism
		CO4	Evaluate the responsibility and accountability of a professional engineer towards design, operation, safety, by adopting risk benefit analysis
		CO5	Judge issues pertaining to individual rights, collegiality, moral dilemmas and conflicts while discharging their professional duties.
		CO6	Analyze cross cultural issues in different ethical domains by acquiring knowledge on intellectual property rights in the context of globalization

Laboratory Subjects

Course Code	Course Title	Experiment No	Course Outcomes	
C316	Advanced Java Programming Lab	1,2,3	CO1	Explain the basic understanding of java.net package
		4,5,6	CO2	Build client server communication using TCP IP and UDP
		7,8,9,10	CO3	Construct applications to implement database

				interaction using JDBC
		11,12,13	CO4	Demonstrate client server interaction using Servlets
		14,15,16	CO5	Develop Java Beans applications
C317	UNIX & System Lab	OS1	CO1	Develop programs for various CPU Scheduling Algorithms
		OS2,OS3,OS6	CO2	Build programs for Memory Management Techniques and Page Replacement Algorithms.
		OS4,OS5,OS7	CO3	Construct programs for various File Allocation Strategies, Deadlock Prevention and Avoidance Techniques.
		LP1,LP3	CO4	Experiment with different Linux commands.
		LP2,LP4,LP5,LP6,LP7, LP8	CO5	Develop programs simulating various OS concepts and Linux commands using System Calls.
C318	Database Management System Lab	1,3,7	CO1	Populate the database using SQL DDL, DML commands and make use of built-in-functions to write queries
		2,4	CO2	Identify and implement different operators and clauses in nested queries to solve real time problems.
		5,6,8,9	CO3	Implement Queries on Joins, and correlated sub-queries with access control capabilities to build reports
		10,11,12,13	CO4	Construct simple PL/SQL programs using control statements and exception handling methods
		14,15,16	CO5	Develop applications using PL/SQL including procedures, functions, cursors, packages, forms and database connectives

6th Semester

Course Code	Course Title	Course Outcomes	
C321	Computer Networks	CO1	Understand the concepts of Network Topologies and network reference models (OSI and TCP/IP reference models).

		CO2	Illustrate Physical layer Guided Transmission media and Multiplexing concepts.
		CO3	Interpret Data link layer Framing Techniques, Error control Techniques using CRC error detection mechanism, flow control mechanisms using Elementary Data Link layer protocols, sliding window protocols Algorithms in a network.
		CO4	Understand the Media (channel) Access control problem in a network using multiple access protocols–ALOHA, CSMA protocols.
		CO5	Make use of the Network Layer routing algorithms to determine the best route (path) in a network communication.
		CO6	Apply the internet Transport layer protocols-TCP,UDP in client – server data communication
C322	Data Mining	CO1	Classify the kinds of data, functionalities, issues in data mining and similarity and dis-similarity measures
		CO2	Illustrate various preprocessing techniques.
		CO3	Develop decision tree algorithms and evaluate the performance of a classifier.
		CO4	Build Classification model using Naive Bayes Classification and Bayessian Networks.
		CO5	Construct association rule generation and identify frequent item sets using apriori and FP growth algorithm.
		CO6	Develop the various kinds of clustering methods and apply the clustering algorithm on a dataset.
C323	Web Technologies	CO1	Illustrate the HTML tags and cascading style sheet formats for developing static web content.
		CO2	Explain the development of dynamic web content using JavaScript
		CO3	Develop the web applications with help of XML and AJAX
		CO4	Build web content by integrating PHP and database
		CO5	Interpret the PERL basic functions and its usage in web applications.

		CO6	Apply ruby programming principles and ruby on rails for developing web applications and other solutions
C324	Software Testing methodologies	CO1	Extend Software Testing to software engineering, distinguish between types of testing and examine the concepts of Flow graphs and Path Testing.
		CO2	Interpret the concepts of transaction flow testing and experiment with the concepts of data flow testing in real-time situations
		CO3	Identify the strategies in domain testing and extend them to path products and expressions.
		CO4	Utilize the concepts of syntax testing in the current programming trend and assess the logic based testing methodologies.
		CO5	Explain the designs of state graphs and graph matrices and apply them with an algorithmic view.
		CO6	Make use of the software testing tools and apply them to resolve the problems in real time environment.
C325	Artificial Intelligence	CO1	Summarize what constitutes "Artificial" Intelligence to implement and identify applications.
		CO2	Apply Problem-solving, Problem reduction and Game playing techniques for solving different types of artificial intelligence problems.
		CO3	Make use of propositional and predicate logic in AI for planning, problem-solving, intelligent control, and diagnosis
		CO4	Apply knowledge representation techniques on AI applications using semantic network and frames.
		CO5	Categorize shells and tools for building expert systems by using AI techniques.
		CO6	Make use of probability theory and fuzzy logic for uncertainty measure in Artificial Intelligence.
C329	IPR& Patents	CO1	Outline concept of Intellectual property rights, IPR tool kitand its importance in the global scenario
		CO2	Demonstrate an understanding about copyright protection, the

			registration process and legal remedies available in case of infringement
		CO3	Explain and gain knowledge on patents, steps for registration and recent developments in patent system
		CO4	Utilize the concept of Trademark, their registration, infringement and related laws
		CO5	Make use of principles of trade secrets and laws of unfair competition
		CO6	Apply the information gained on cyber laws and cyber - crimes in the domain of e-commerce and data security

Laboratory Subjects

Course Code	Course Title	Experiment No	Course Outcomes	
C326	Web Technologies Lab	1,2,3,4,5	CO 1	Apply and make use of HTML, CSS to develop the web applications.
		6	CO 2	Build the web application for data storage and transmission over net using XML
		7,8,9,10,11,12,13,14	CO 3	Construct basic operations and GUI applications using Ruby language
		15,16,17,18	CO 4	Develop operations on data and database using PERL
		19,20,21,22,23,24,25	CO 5	Construct usage of cookies and database applications using PHP script
C327	Software Testing Lab	1,2	CO 1	Build programs concerning loops and matrices in C and Develop appropriate test cases using Adhoc testing and black-box testing.
		3, 4, 5	CO 2	Construct test cases for known applications like ATM/Banking/Library management to utilize BBT, BVA, equivalence class partitioning etc. and model a test plan.
		6a, b, c, d, e	CO 3	Examine the deployment, usage and testing script language in the automated tool WinRunner.

		6d, e, f	CO 4	Apply WinRunner on GUIs and summarize their behavior and performance.
		6g, h, i, j, and 7	CO 5	Develop Data-Driven Tests and batch tests on GUIs and apply Win Runner on any real-time application.
C328	Data Mining Lab	Exp1,Exp 2	CO 1	Demonstration of preprocessing on dataset student.arff and Labor.arff
		Exp3,Exp 4	CO 2	Build Association rules on dataset contactlenses.arff and test.arff using apriori algorithm
		Exp5,Exp 6	CO 3	Make use of classification rule process on dataset student.arff and employee.arff using j48 algorithm
		Exp7,Exp 8	CO 4	Apply classification rule process on dataset employee.arff using ID3 and Naive Bayes algorithm
		Exp9,Exp 10	CO 5	Demonstration of clustering rule process on dataset iris.arff and student.arffusing simple k-means

7th Semester

Course Code	Course Title	Course Outcomes	
C411	Cryptography & Network Security	CO1	Classify various Security attacks ,Services, Mechanisms and Mathematics of Cryptography
		CO2	Relate Mathematics of Symmetric Key Cryptography and Apply the Symmetric key Cryptography like DES, AES.
		CO3	Relate Mathematics of Asymmetric Key Cryptography and Apply the Asymmetric key cryptography
		CO4	Make use of Data Integrity, Digital Signature Schemes & Key Management for verifying the authenticity of digital messages
		CO5	Select protocols like PGP,S/MIME in Application layer and SSL,TLS in Transport layer to Secure the Network during data transmission
		CO6	Select Internet protocol security (IPsec) at the Network Layer to provide security for Internet Protocol
C412	Mobile	CO1	Interpret the basic concepts, principles in mobile

	Computing		computing, Sensor Networks and develop new protocols related to mobile environment.
		CO2	Apply various access control techniques for Efficient and scalable Mobile Communication.
		CO3	Illustrate Mobile IP, packet delivery and Dynamic Host Configuration Protocols.
		CO4	Solve any new technical issue related to this new paradigm.
		CO5	Summarize data delivery mechanisms, data dissemination and data Synchronization and develop new mobile applications.
		CO6	Develop new mobile and ad hoc network applications and/or algorithms/protocols.
C413	Data Ware Housing and Business Intelligence	CO1	Summarize the data mining task primitives, functionalities, classification along with Data Warehousing concepts
		CO2	Illustrate various pre-processing techniques
		CO3	Construct Association rules and identify frequent item sets using FP growth algorithm along with mining multi-dimensional association rules
		CO4	Illustrate various classification and cluster analysis techniques.
		CO5	Identify the appropriate data mining technique for mining stream, spatial, sequence and text data
		CO6	Explain the concepts of web mining, web structure mining and demonstrate the need of data mining in business intelligence applications.
C414	Managerial Economics & Financial Analysis	CO1	Learn the concepts of Managerial Economics and utilize the demand forecasting methods to predict demand of a product
		CO2	Make use of Production function & economies of scale and assess the BEP of their own business
		CO3	Understand the concepts of competitive market situations
		CO4	Classify the types of business organizations and identify the stages of business cycles to improve the organizations
		CO5	Analyze accounting concepts to prevent loss for the organization
		CO6	Identify the sources of raising capital for business undertaking
C415	Big Data Analytics	CO1	Summarize the Data Structures and Generics in JAVA
		CO2	Outline the building blocks of Hadoop and Summarize the different modes of Hadoop installation
		CO3	Experiment by writing basic Map Reduce programs

		CO4	Make use of Hadoop I/O and writable interfaces for building Map Reduce applications
		CO5	Demonstrate PIG Architecture and Develop PIG scripts.
		CO6	Apply HIVE to structured data and Develop HIVE Queries
C416	Cloud Computing	CO1	Make use of the system models for distributed and cloud computing through which HPC and HTC can be obtained.
		CO2	Extend the virtualization concept to chips, CPUs, networks and data centers
		CO3	Apply the offered services, servicing models, cloud platforms and bring-out an efficient SOA
		CO4	Identify the features of distributed and grid platforms and survey the services offered by Google App Engine, AWS and MS-Azure
		CO5	Analyze cloud resource management, queuing methodologies and scheduling of the Map Reduce applications
		CO6	Illustrate different file systems like Google file system, Apache Hadoop and Amazon S3.

Laboratory Subjects

Course Code	Course Title	Experiment No	Course Outcomes	
C417	Mobile Computing Lab	1,2,3,4	CO1	Demonstrate the installation of various mobile development frameworks (Sun Java Wireless Tool Kit, Eclipse with J2ME plugin for Java supported mobile devices and learn how to work with components and structure of frameworks to create user interfaces
		5,6	CO2	Illustrate user interfaces for interacting with apps and triggering actions and handling multiple activities and develop MIDP Applications.
		7,8,9	CO3	Develop a working application with an authenticated Mobile Client Server Connectivity and thereby perform message exchange.

		10,11,12	CO4	Develop a working application in Android mobile platforms. Illustrate Graphical Layouts for better user interfaces and interaction with Android applications.
		13,14	CO5	Create useful Android applications for the current scenario in mobile computing
C418	Cryptography and Network Security Lab	1,2,3	CO1	Build programs on classical cipher techniques by replacing letters with other letters
		4,5	CO2	Construct programs using message authentication code and cryptographic hash function methods for verification of message integrity
		6,7	CO3	Implement programs on modern symmetric-key cipher techniques such as DES, and AES
		8,9	CO4	Implement programs using asymmetric-key cipher techniques
		10	CO5	Develop programs on digital signature that provides message authentication, integrity, and non-repudiation

8th Semester

Course Code	Course Title	Course Outcomes	
C421	Distributed Systems	CO1	Outline the important characteristics of Distributed Systems and salient features of Distributed Systems
		CO2	Make use of Inter process communication mechanisms with TCP and UDP protocols in Distributed systems
		CO3	Apply RMI and RPC for Remote Invocation in Distributed systems for Distributed Objects.
		CO4	Illustrate the Operating systems facilities at the nodes of a Distributed Systems
		CO5	Examine the different file management systems of Distributed nature and to choose appropriate algorithm for process coordination and agreement.
		CO6	Distinguish various protocols for transaction and replication in distributed systems
C422	Management Science	CO1	Appraise the practices of management concepts in the business environment and evaluate various types of organization structures.

		CO2	Identify the production management practices and distinguish the different stock levels of an organization.
		CO3	Prepare an appropriate marketing mix and determine the recruitment process in global competitive environment.
		CO4	Evaluate the project process on the basis of costs and time.
		CO5	Recognize and analyze the strategies of the firm and can re discover the SWOT of themselves.
		CO6	Understand and develop the contemporary management practices such as MIS, MRP, TQM,ERP, BPO and assess the changing business environment.
C423	Management Information System	CO1	Understand the concepts and technologies of Organization and developing strategic plan for an information system.
		CO2	Develop models for representing Systems and application of systems to case studies.
		CO3	Understand the characteristics of Information systems ,for appropriate decision making and approaches/tools to be used.
		CO4	Analyze the issues involved in the management and development of decision support systems.
		CO5	Show a practical level of competence in building applications for budgeting and planning that automate business applications.
		CO6	Examine the significance of development and maintenance of information systems appropriate to industry and organizational environments.
C424	Artificial Neural Networks	CO1	What constitutes Artificial Neuron? and classify different Network Architectures and Active Functions in ANN
		CO2	Relate mathematical basis of learning mechanisms through ANN
		CO3	Construct different classifiers using structure and learning of perceptrons
		CO4	Apply back propagation Algorithm with multilayer feed forward ANN on real world problems
		CO5	Apply regularization using Radial Basis Function Networks and Summarize approximation properties of RBF
		CO6	Explain a Support Vector Machine and Apply to solve linear separable real world problem.
C425	Seminar	CO1	Outline the important concepts to gain factual knowledge.

		CO2	Organize the presentation and disseminate ideas effectively with good communication skills.
		CO3	Develop self-learning & time management skills to engage in continuous learning.
		CO4	Synthesize and reflect on to show the depth of knowledge in a compelling, well-structured and professional behavior.
		CO5	Develop writing skills with clarity of thought and expression.
C426	Project	CO1	Demonstrate the technical knowledge to identify problems in the field of Computer Science and Engineering and its allied areas.
		CO2	Analyze and formulate technical projects with a comprehensive and systematic approach.
		CO3	Identify the modern tools to implement technical projects.
		CO4	Design engineering solutions for solving complex engineering problems.
		CO5	Develop effective communication skills, professional behavior and team work.