

**COURSE OBJECTIVES AND COURSE OUTCOMES (R15 Regulation)**

| Dept | Year & Semester | Course Code | Course Name                      | Course Outcomes  |
|------|-----------------|-------------|----------------------------------|--|
| IT   | 2 year I sem    | IT211       | Data Structures                  | 1. Analyze, evaluate and choose appropriate abstract data type and algorithms to solve particular problems 2. Compare and contrast the benefits of dynamic and static data structures implementations 3. Design and implement abstract data types such as linked list, stack, queue and tree by Using C as the programming language using static or dynamic implementations 4. Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs  |
| IT   | 2 year I sem    | IT212       | Digital Logic Design             | 1. Analyze and synthesize logic circuits by applying the knowledge of number systems, codes, Boolean algebra and digital logic circuits to solve typical problems on the same. 2. Minimize the given Switching function in SOP and POS forms using K-Map & Design of different types of combinational logic circuits using various logic gates. 3. Design and analyze synchronous sequential logic circuits including registers & counters using gates & flip-flops. 4. Design combinational logic circuits using different types of PLDs namely, PROM, PLA and PAL.   |
| IT   | 2 year I sem    | IT213       | Discrete Mathematical Structures | 1. To understand set theory, relations, mathematical logic mathematical reasoning and to study about the validity of the arguments. 2. Be able to apply basic counting techniques to solve combinatorial problems. 3. To understand Recurrence Relation, Generating functions and solving problems involving recurrence equations. 4. To familiarize the different types of binary relations and related algorithms on transitive closure. 5. To familiarize with the applications of graphs, trees and algorithms on minimal spanning tree.   |
| IT   | 2 year I sem    | IT214       | Computer Organization            | 1. Understand Register transfer language, computer instructions and solve problems using micro operations 2. Analyze micro program control to implement micro program instructions 3. Understand central processing unit, stack organization and to evaluate stack operations 4. Review peripheral devices, types of memories and analyze how mapping is done between various memories.  |
| IT   | 2 year I sem    | IT215       | Data Communications              | 1. Understand the basic concepts of Data Communications and different models 2. Understand and analyses the characteristics of signals propagated through different transmission media 3. Apply signal encoding techniques, error detection, correction techniques and learn interfacing 4. Distinguish various Multiplexing techniques and learn various modems like ADSL, xDSL. 5. Illustrate various Data link control protocols namely flow control, error control and HDLC  |
| IT   | 2 year I sem    | IT216       | Data Structures Lab              | 1. Implement linear data structures such as stacks, queues, linked lists and apply on real time problem like conversions & evaluations of expressions. 2. Implement non linear data structures such as Trees and Graphs and apply on real time problem like finding shortest path. 3. Implement different sorting and searching techniques.  |
| IT   | 2 year I sem    | IT217       | Digital Electronics lab          | 1. Identify various analog (active and passive), digital electronic components. 2. Design and Analyze different circuits using analog ICs like operational amplifier and regulators. 3. Simplify the given Boolean function and implement using logic gates using Integrated Circuits. 4. Design, Analyze and Implement combinational and sequential digital circuits. 5. Model combinational and sequential digital circuits using VHDL program in behavioral, structural, and dataflow models. 6. Develop test benches to simulate combination and sequential circuits, perform functional and timing verifications of digital circuits. |
| IT   | 2 year I sem    | IT218       | Python Programming Lab           | 1. Understand and use the syntaxes of python in problem solving 2. Apply python data structures to solve real world problems 3. Implement object oriented concepts in python programming 4. Demonstrate File I/O and exception handling  |

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| IT | 2 Year II sem | IT221 | Computer Networks                       | 1. Be able to analyze different network architecture's and design. 2. Mathematically model various error control and routing schemes. 3. Ability to analyze the working of LAN in an organization. 4. Ability to design network architecture for an organization. 5. Ability to design and implement a network for scalability and robustness and security.   |
| IT | 2 Year II sem | IT222 | Information Systems Design              | 1. Understand the Information systems and systems design. 2. Apply the knowledge of information gathering, Requirement analysis in Software Engineering. 3. Will be able to identify specific components of a software design and use in Interface Designing 4. Use the knowledge of testing and estimate the software development cost   |
| IT | 2 Year II sem | IT223 | Operating Systems                       | 1 Learn basics of operating system and their structures. 2 Analyze various issues related to inter process communication like process scheduling, resource management and deadlocks. 3 Interpret the issues and challenges of memory management. 4 Understand the concepts of I/O management, file system implementation and problems related to security and protection.   |
| IT | 2 Year II sem | IT224 | Probability Statistics & Queuing Theory | 1. Understand the concepts of various statistical measures like mean, variance and standard deviation of a random variable. 2. Familiarize the different types probability distributions and their properties. 3. Compute simple correlation between the variables and fit straight line, parabola by the principle of least squares. 4. Analyze the statistical data and apply various small or large sample tests for testing the hypothesis. 5. Learn about different Queuing models and its applications                  |
| IT | 2 Year II sem | IT225 | Computer Graphics & Multimedia          | 1. Understand Computer graphics applications and apply algorithms to obtain output primitives.. 2. Apply Geometric Transformations on multimedia. 3. Students will understand the concepts and techniques used in 3D computer graphics. 4. Apply 2D and 3D multimedia building blocks to Develop multimedia applications.   |
| IT | 2 Year II sem | IT226 | Networking Lab                          | 1. Understand and identify the various network infrastructure and command needed for network design and troubleshooting. 2. Understand the basic concepts and functions of Layer 1 (Hubs), Layer 2(Switches and bridges) and Layer 3 (Router). 3. Understand the building components of network design. 4. Understand the basic format of known protocols such as TCP, UDP, ICMP..Etc. 5. Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks. |
| IT | 2 Year II sem | IT227 | Computer Graphics & Multimedia Lab      | 1. Draw various types of lines and curves. 2. Create animation: using various editing tools 3. Use audio, video, internet editing tools to develop multimedia applications  |
| IT | 2 Year II sem | IT228 | Operating Systems (Linux) Lab           | 1. Implement scheduling algorithms, deadlock management. 2 Implement free space management and page replacement strategies. 3. Implement file allocation methods and disk scheduling algorithms.  |
| IT | 3 Year I sem  | IT312 | Database Management Systems             | 1. Understand Basics and applications of database systems. 2. Construct ER Model and Write queries using SQL. 3. Apply Normalization principles on databases. 4. Familiar with transaction processing, concurrency control and database recovery.   |
| IT | 3 Year I sem  | IT313 | Unix Network Programming                | 1. Get familiar with the variety of interfaces and frameworks for network applications 2. Get the knowledge of Interfaces, STREAMS, sockets, RPC libraries. 3. Know the underlying mechanisms to program client-server model. 4. Using UNIX socket system calls to manage multiple I/O streams  |
| IT | 3 Year I sem  | IT314 | Formal Languages Automata Theory        | 1. Understand and Design Regular Languages, Finite Automata. 2. Analyze Context Free Languages and Design Push Down Automata. 3. Construct Turing Machines. 4. Discriminate Decidability, Undecidability and Analyze Recursive Enumerability.   |

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| IT | 3 Year I sem  | IT315    | Object Oriented Programming through JAVA                 | 1. Understand and apply OOP and Java programming in problem solving 2. understand multithreading and evaluate exception handing to create new applications 3. Apply the concepts of Java Files, collections and database in real time problem solving 4. Design GUI applications   |
| IT | 3 Year I sem  | IT316    | Database Management Systems Lab                          | 1. Create and manipulate Relational Database using SQL 2. Write PL/SQL programs, Triggers and Cursors  |
| IT | 3 Year I sem  | IT317    | Unix Network Programming Lab                             | 1. write, execute and debug c programs which use Socket API 2 understand the use of client/server architecture in application development 3. Design reliable servers using both TCP and UDP sockets  |
| IT | 3 Year I sem  | IT318    | Java Programming Lab                                     | 1. Demonstrate OOP and Java programming in problem solving. 2. Apply multithreading and evaluate exception handing to create new applications 3. Create Java Files and apply collections in real time problem solving 4. Design simple and complex UI applications   |
| IT | 3 Year I sem  | IT319    | Quantitative Aptitude - 1 & Verbal Aptitude – 1          | 1. Solve problems related to numerical computations in company specific and other competitive tests. 2. Able to recall and use the concepts to solve problems numerical 1. Detect grammatical errors in the text/sentences and rectify them while answering their competitive / company specific tests and frame grammatically correct sentences while writing. 2. Answer questions on synonyms, antonyms, hyponyms, hypernyms and other vocabulary based exercises while attempting company specific and other competitive tests. 3. Use their logical thinking ability and solve questions related to reasoning based exercises. 4. Choose the appropriate word/s/phrases suitable to the given context in order to make the sentence/paragraph coherent. 5. Analyze the given data/text and find out the correct responses to the questions asked based on the reading exercises; identify relationships or patterns within groups of words or sentences. estimation with respect to company specific and competitive tests. 3. Apply basic principles related to geometry and mensuration & solve questions in company specific and competitive tests. |
| IT | 3 Year II sem | IT321    | Compiler Design  | 1. Familiar with finite automata, regular expressions and describe compiler architecture. 2. Evaluate lexical analyzer and design parsers. 3. Analyze symbol table and formulate intermediate code. 4. Analyze register allocation, code optimization techniques.  |
| IT | 3 Year II sem | IT322    | Design & Analysis of Algorithms                          | 1. Understand the use of various data structures and complexity notations to solve problems. 2. Apply different techniques like decrease and conquer, divide and conquer etc., to solve various problems. 3. Design an appropriate algorithm to solve the problem. 4. Evaluate time complexities of various algorithms.  |
| IT | 3 Year II sem | IT323    | Object Oriented Analysis and Design with UML             | 1. Analyze the project using Object Oriented concepts. 2. Design models for software 3. Design classless and interactions for a project 4. Apply analysis and design methods   |
| IT | 3 Year II sem | IT324    | Mobile Computing and Application Development             | 1. Understand the fundamentals of Android system 2. Learn and Use Mobile User Interfaces 3. Apply Database concepts in App Development 4. Develop and publish an App   |
| IT | 3 Year II sem | IT325(A) | Professional Elective-I(Distributed systems)             | 1. Discuss trends in Distributed Systems. 2. Understand communication in Distributed systems 3. Understand synchronization and shared memory in Distributed systems 4. Design process and resource management systems 5 Analyze the file system in DOS and name it accordingly   |
| IT | 3 Year II sem | IT325(C) | Professional Elective-I(Software Testing and Automation) | 1. Apply software testing knowledge and engineering methods for software testing project. 2. understand and identify various software testing problems 3. Have basic understanding, knowledge of contemporary issues in software testing and test planning. 4. Develop a test tool to support test automation.   |

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| IT | 3 Year II sem | IT325(D) | Professional Elective-I(Client Server Technologies)  | 1. Introduce the client server architecture and fundamentals of distributed systems 2. Understand applications and computing aspects of client/ server approach 3. Analyze the hardware and software structure of a client/server model 4. Understand the categories, classes and environment of server 5 Understand the structural design of server operating systems   |
| IT | 3 Year II sem | IT325(B) | Professional Elective-I(Technology management)       | 1. Understand Decision support system, Knowledge Management System 2. Acquire the knowledge on Data Warehousing, Intranets 3. Understand the concepts of E- Business, E – Governance 4. Gain the knowledge on Testing  |
| IT | 3 Year II sem | IT326    | Mobile Computing and Application Development Lab     | 1. Apply the concepts to building simple app 2. Develop mobile application   |
| IT | 3 Year II sem | IT327    | Web based open source technologies Lab               | 1. Identify XHTML/HTML5/CSS and create a basic page with these languages 2. Identify the types of images used in modern web design and explain what types are appropriate for different functions 3. Understand the various platforms, devices, display resolutions, viewports, and browsers that render websites 4. Use the gathered requirements to create and utilize a wireframe to further plan a website design Work within a modern content management system (CMS), WordPress 5. Recognize the various tools to plan, design, code, and share projects/documents |
| IT | 3 Year II sem | IT328    | Computer aided software engineering tools Lab        | 1. Design and implement projects using OO concepts 2. Use the UML analysis and design diagrams 3. Create code from design and contrast various testing techniques  |
| IT | 3 Year II sem | IT329    | Soft Skills lab                                      | 1 Comprehend the core engineering subjects using effective verbal and nonverbal communication skills. 2 Present accurate and relevant information efficiently, using suitable material aids. 3 Work effectively as individuals as well as in teams and emerge as responsible leaders with appropriate professional ethics. 4 Participate in group discussions and interviews using analytical and problem solving abilities, which enhance their employability skills. 5 Set time bound goals and realize them through strategic plans for successful career.            |
| IT | 3 Year II sem | IT3210   | Quantitative Aptitude-2 & Verbal Aptitude -2         | 1 Use their logical thinking and analytical abilities to solve reasoning questions from company specific and other competitive tests. 2 Solve questions related to permutation & combinations and probabilities from company specific and other competitive tests. 3 Understand and solve puzzle related questions from specific and other competitive tests   |
| IT | 4 Year I sem  | IT411    | Cryptography & Network Security                      | CO1 Able to encrypt and decrypt information using some of the standard algorithms CO2 To develop strategies to protect organization information assets from common attacks. CO3 Understand how authentication is implemented in wireless systems CO4 Acquire knowledge on the role of a “professional computing practitioner” with particular regard to an understanding of legal and ethical issues   |
| IT | 4 Year I sem  | IT412    | Data Analytics                                       | 1. Understand big data and Apache Hadoop Eco system 2 Apply Hadoop concepts 3. Understand the design of Hadoop Distributed file system 4. Understand concepts of map and reduce and functional programming   |
| IT | 4 Year I sem  | IT414(A) | Professional Elective – III(Artificial Intelligence) | CO1 Understand the concepts of State Space and Heuristic Search Algorithms. CO2 Solve problems in propositional logic, predicate calculus and other axiomatic systems. CO3 Understand the role of knowledge representation, problem solving and learning in intelligent systems. CO4 Differentiate traditional systems and various Rule-based and Expert Systems. CO5 Understand the working of different categories of Neural Networks.   |
| IT | 4 Year I sem  | IT414(B) | Professional Elective – III(Parallel Computing)      | CO1 Can analyze the need for high performance and parallel programming models. CO2 Can write and analyze the behavior of high performance parallel programs for distributed memory architectures (using MPI). CO3 Can write and analyze the behavior of high performance parallel programs for shared memory architectures (using Pthreads and OpenMP). CO4 Can write simple programs for the GPU.   |

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| IT | 4 Year I sem  | IT414(C) | Professional Elective – III(Data WareHouse and Mining)   | CO1 Understand why there is a need for data warehouse in addition to traditional operational database systems. CO2 Identify components in typical data warehouse architectures. CO3 Understand why there is a need for data mining and in what ways it is different from traditional statistical techniques. CO4 Understand the details of different algorithms made available by popular commercial data mining software.                        |
| IT | 4 Year I sem  | IT414(D) | Professional Elective – III(Software Project management) | CO1 Understand the principles of software project management CO2 Demonstrate cost estimation CO3 Understand risk management and control the project CO4 Manage the software project   |
| IT | 4 Year I sem  | IT413(A) | Professional Elective – II(Machine Learning)             | CO 1 Identify the applications of Machine learning and able to state the developing of Learning System. CO 2 Classify Decision Tree Learning Algorithms for learning of appropriate problems. CO 3 Use Learning Algorithms to classify text by applying various Classification Algorithms. CO 4 Formulate Computational Learning Theory for Finite and Infinite hypothesis spaces. CO 5 Generate Rule Sets and setup First Order Rules.           |
| IT | 4 Year I sem  | IT413(B) | Professional Elective – II(Storage Area Networks)        | CO 1 Understand Storage Area Networks characteristics and components. CO 2 Become familiar with the SAN application environment, network storage and topologies CO 3 Identifying the issues and down time's in relation with the SAN failure CO 4 Understand the technology related to back up's CO 5 Analyze and understand the security and monitoring aspects in SAN's   |
| IT | 4 Year I sem  | IT413(C) | Professional Elective – II(User Experience)              | CO 1 analyze users' needs, usability goals and user experience goals of a software application CO 2 use software prototyping tools to design user interfaces that take into account human capabilities and constraints, users' needs, usability goals CO 3 implement functional user interface prototypes based on the design process CO 4 critically evaluate the usability of software application  |
| IT | 4 Year I sem  | IT415    | Analytics Lab  | 1. Understand the Big Data Platform and its Use cases 2. demonstrate HDFS Concepts and Interfacing with HDFS 3. use Map Reduce Jobs in various applications 4. Apply analytics on Structured, Unstructured Data.  |
| IT | 4 Year I sem  | IT416    | Network Security Lab                                     | 1) Implement the cipher techniques 2) Develop the various security algorithms 3) Use different open source tools for network security and analysis  |
| IT | 4 Year I sem  | IT417    | Project - 1  |   |
| IT | 4 Year II sem | IT421(A) | Professional Elective – IV(Soft Computing)               | CO1 Identify and describe soft computing techniques and their roles in building intelligent systems. CO2 Recognize the feasibility of applying a soft computing methodology for a particular problem. CO3 Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems. CO4 Apply genetic algorithms to combinatorial optimization problems. CO5 Apply neural networks to pattern classification and regression problems. |
| IT | 4 Year II sem | IT421(B) | Professional Elective – IV(COGNITIVE Computing)          | 1. Understand applications in Cognitive Computing. 2. Understand Natural language processor role in Cognitive computing . 3. Learn future directions of Cognitive Computing. 4. Evaluate the process of taking a product to market.   |
| IT | 4 Year II sem | IT421(c) | Professional Elective – IV(Cloud Computing)              | CO1 Understand the evolution of cloud computing paradigm and its architecture CO2 Explain and characterize different cloud deployment models, service models and technological drivers CO3 Understand the programming model and application environment including the role of the Operating systems CO4 Analyze open source support and networking of cloud CO5 Identify the security issues in cloud computing                                   |
| IT | 4 Year II sem | IT421(D) | Professional Elective – IV(Ecommerce)                    | CO1 Understand the fundamental concepts of Electronic commerce environment and modes CO2 Identify the approaches and authenticative methods for safe E-Commerce CO3 Apply secure E-mail technologies for E-Commerce CO4 Use the key aspects of Internet Resources for Commerce, internet Access   |

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| IT | 4 Year II sem | IT422(A) | Professional Elective – IV(Image Processing) | CO1 Explain Basic Concepts in Image Processing and various color models CO2 Apply Spatial Domain Techniques for Image Enhancement CO3 List the Image Compression Techniques CO4 Discuss Various Morphological Algorithms CO5 Classify Various Image Segmentation Techniques  |
| IT | 4 Year II sem | IT422(B) | Professional Elective – IV(Cyber Security)   | CO 1 Understand cyber crimes and types of cyber attacks CO 2 Know how to prevent themselves from cyber attacks CO 3 Identify applicable cyber laws   |
| IT | 4 Year II sem | IT422(C) | Professional Elective – IV(ERP)              | CO 1 Understand the fundamental concepts of ERP systems their architecture, and working of different modules in ERP. CO 2 Know how to implement activities of ERP project management cycle CO 3 Understand the emerging trends in ERP developments.  |
| IT | 4 Year II sem | IT422(D) | Professional Elective – IV(IOT)              | CO 1 Understand the concepts of Internet of Things CO 2 Know basic communication protocols in IoT CO 3 Design IoT applications in different domains and Implement basic IoT applications on embedded platforms CO4 Learn real world application scenarios of IoT along with its societal and economic impact using case studies. |
| IT | 4 Year II sem | IT422    | Project - 2                                  |  |
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| Dept | Year & Semester | Course Code | Course Name                      | Course Outcomes   |
|------|-----------------|-------------|----------------------------------|---|
| IT   | 2 Year I sem    | IT211       | Data Structures                  | 1. Analyze and choose appropriate ADT to solve a given problem 2. Compare and contrast the benefits of dynamic and static data structures and implement Searching and sorting techniques 3. Design and implement abstract data types such as linked list, stack, queue and tree in static and dynamic context using C programming language 4. Develop a C program for solving real world problems using linear and non-linear data structures.  |
| IT   | 2 Year I sem    | IT212       | Basics of Electrical Engineering | 1. Calculate voltage across, current through and power supplied / absorbed by an electrical 2. Analyze magnetic circuit 3. Obtain the performance characteristics of D.C. Generators. 4. Obtain the performance characteristics of D.C. Motors. 5. Obtain the performance characteristics of Transformer and Induction Motor.   |
| IT   | 2 Year I sem    | IT213       | Discrete Mathematical Structures | CO - 1 Understand mathematical logic, mathematical reasoning and to study about the validity of the arguments and also prove mathematical theorems using mathematical induction. CO - 2 Determine properties of binary relations, identify equivalence and partial order relations, sketch relations and Familiarize with algebraic structures. CO - 3 Apply counting techniques to solve combinatorial problems and identify, formulate, and solve computational problems in various fields. CO - 4 Understand Recurrence Relation, Generating functions and solving problems involving recurrence equations. CO - 5 Familiarize with the applications of graphs, trees and algorithms on minimal spanning tree and apply graph theory in solving computing problems |
| IT   | 2 Year I sem    | IT214       | Computer Organization            | 1. Solve problems using micro operations and computer arithmetic operations. 2. Interpret hardwired and micro programmed way of designing the control unit of a digital computer. 3. Identify and compare different issues related to organization of CPU 4. Judge the working of different hardware components associated with the input-output organization of a computer. 5. Categorize memory organization and explain the function of each element of a memory hierarchy   |

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| IT | 2 Year I sem  | IT215 | Microprocessors                            | 1. Describe the architecture of microprocessors 8085/8086. Illustrate machine level instructions with timing diagrams 2. Demonstrate methods of accessing information in machine memory using direct or indirect addressing schemes, and describe various memory management schemes used in typical microcomputer systems including segmented and virtual memory. 3. Write debug and analyze assembly language programs for the 8085/8086 microprocessor instruction set. 4. Illustrate the usage of stack in subroutine and interrupt handling   |
| IT | 2 Year I sem  | IT216 | Data Structures Lab                        | 1. Implement linear data structures such as stacks, queues, linked lists and apply on real time problem like conversions & evaluations of expressions. 2. Implement non linear data structures such as Trees and Graphs and apply on real time problem like finding shortest path. 3. Implement different sorting and searching techniques.   |
| IT | 2 Year I sem  | IT217 | Computer Organization & Microprocessor Lab | 1. Design digital logic circuits. 2. Write debug and analyse assembly language programs for the 8085/8086 microprocessor instruction set. 3. Execute assembly language programs using trainer kits/TASM or MASM software and analyze and interpret the results.   |
| IT | 2 Year I sem  | IT218 | Python Programming lab                     | 1. Develop python programs using control flow statements. 2. Express proficiency in handling of strings and Lists. 3. Develop programs using data structures like dictionaries, tuples and sets. 4. Design programs using file operations and regular expressions. 5. Develop applications using Object-Oriented Programming concept such as encapsulation, inheritance and polymorphism  |
| IT | 2 Year II sem | IT221 | Operating Systems                          | 1. Analyze basic concepts of operating system and their structures 2. Analyze various issues related to inter process communication like process scheduling, resource management and deadlocks. 3. Interpret the issues and challenges of memory management. 4. Synthesize the concepts of I/O management, file system implementation and problems related to security and protection   |
| IT | 2 Year II sem | IT222 | Probability Statistics & Queuing Theory    | CO - 1 Demonstrate basic principles of probability and understand a random variable that describe randomness or an uncertainty in certain realistic situation. It can be of either discrete or continuous type. CO - 2 Comprehend concepts of discrete, continuous probability distributions and able to solve problems of probability using Binomial, Poisson, Uniform Distribution, Exponential Distribution, Normal distributions. CO - 3 Compute simple correlation between the variables and fit straight line, parabola by the principle of least squares. CO - 4 Analyze the statistical data and apply various small or large sample tests for testing the hypothesis. CO - 5 Understand about different Queuing models and its applications. |
| IT | 2 Year II sem | IT223 | Data Communications                        | 1. Understand and explain the concept of Data Communication and networks, layered architecture and their applications. 2. Acquire the knowledge of different modulation techniques such as AM, FM and study the block diagrams of transmitter and receiver 3. Learn the concepts of Digital modulation techniques such as PCM, DM, ADM and multiplexing techniques. 4. Analyze different transmission mediums and switching techniques for effective reliable communication. 5. Understand the design of telephone and cable networks in understand a communication model   |
| IT | 2 Year II sem | IT224 | Database Management Systems                | 1. Model applications data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model. 2. Apply relational database theory and describe relational algebra expression, tuple and domain relation expression for queries. 3. Write SQL commands to create tables and indexes, insert/update/delete data and query data in a relational DBMS. 4. Optimize the database design by applying functional dependency and normalization principles. 5. Examine the serializability of non-serial schedules and compare and contrast the concurrency control protocols.   |

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| IT | 2 Year II sem | IT225 | Object Oriented Programming using JAVA     | 1.Apply OOP concepts in problem solving. 2.Develop Applications using exception handling and multithreading. 3.Apply the concepts of Java Files, collections and database in real time problem solving. 4.Design GUI applications using AWT and Swing components. 5.Design GUI applications using event handling, applets.              |
| IT | 2 Year II sem | IT226 | Object Oriented Programming using JAVA Lab | 1.Apply OOP concepts of Java for problem solving. 2.Apply multithreading and exception handling. 3.Apply the concepts of Java Files, collections and database in real time problem solving. 4.Design GUI applications using AWT and Swing components. 5.Design GUI applications using event handling, applets.                          |
| IT | 2 Year II sem | IT227 | Operating Systems Lab                      | 1. Analyze process management and simulate CPU Scheduling Algorithms like FCFS, Round Robin, SJF, and Priority., deadlock management. 2. Implement memory management schemes and page replacement schemes. 3. Implement file allocation methods and disk scheduling algorithms. 4. Experiment with Unix commands and shell programming  |
| IT | 2 Year II sem | IT228 | Database Management Systems Lab            | 1. Design and implement a database schema for a given problem domain. Query a database using SQL DML/DDI commands. 2. Declare and enforce integrity constraints on a database using RDBMS and optimize the database using normalization concept. 3. Programming PL/SQL including stored procedures, stored functions, cursors, packages |