**Course Outcomes**

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| **Semester I** |
| **S No** | **Sub Code** | **Subject Title** | **Outcomes** |
| 1 | CS | 5101 | Object Oriented Programming | * Be able to understand the difference between object oriented programming and procedural oriented language and data types in C++.
* Be able to program using C++ features such as composition of objects, Operator overloading, inheritance, Polymorphism etc.
* At the end of the course students will able to simulate the problem in the subjects like Operating system, Computer networks and real world problems.
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| 2 | IT | 5101 | Fundamentals of IT & Applications | * To understand the basics of computer system, its architecture, database and Networks.
* To understand the basic concepts, terminology of IT and familiar with the use of IT tools.
* To Learn and explore new IT techniques in various applications and to identify the issues related to security.
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| 3 | IT | 5102 | Digital Electronic & Logic Design | * Perform conversions among different number systems, became familiar with basic logic gates and understand Boolean algebra and simplify simple Boolean functions by using basic Boolean properties & design of combinational circuits such as MUX, DEMUX, Encoder and Decoder etc.
* Understand the design of sequential Circuits such as Flip-Flops, Registers, and Counters.
* Obtain a basic level of Digital Electronics knowledge and set the stage to perform the analysis and design of Complex Digital electronic Circuits.
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| 4 | CS | 5151 | Object Oriented Programming lab | * To familiarize the students with language environment.
* To implement various concepts related to language.
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| 5 | IT | 5151 | Fundamentals of IT & Applications lab | * To learn the working knowledge of hardware and software of computer.
* To learn the use of database such as Microsoft access.
* To learn the various features of MS-Office.
* To familiarize the students with the network devices and the internet.
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| **Semester II** |
| 1 | IT | 5201 | Data Structures | * To access how the choices of data structure & algorithm methods impact the performance of program.
* To Solve problems based upon different data structure & also write programs.
* Choose an appropriate data structure for a particular problem.
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| 2 | IT | 5202 | Microprocessor & Interfacing | * Introduction to the Architecture and programming of the microprocessor 8085.
* Learning about interfacing and various applications of microprocessor.
* A study of advanced microprocessors.
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| 3 | IT | 5203 | Internet Programming | * Learn the basic concepts& techniques of java.
* Learn the advanced concepts of java.
* Generate an application based upon the concepts of java & advance java.
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| 4 | IT | 5251 | Data Structures lab | * Know about the basic concepts of Function, Array and Link-list.
* Understand how several fundamental algorithms work particularly those concerned with Stack, Queues, Trees and various Sorting algorithms.
* Design new algorithms or modify existing ones for new applications and able to analyze the space & time efficiency of most algorithms.
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| 5 | IT | 5252 | Microprocessor & Interfacing lab | * Provide practical hands-on experience with microprocessor applications and interfacing techniques.
* Understand 8085 microprocessor kit, knowledge of 8085 instruction set and ability to utilize it in assembly language programming.
* Understand real mode Memory addressing and ability to interface various devices to the microprocessor.
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| 6 | IT | 5253 | Internet Programming lab | * Write programs based upon java concepts.
* Create animation & events based upon advanced java concepts.
* Connect an application with database.
* Develop programs using java collection API as well as java Standard Library.
* Write, debug & document well structured java application
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| **Semester III** |
| 1 | IT | 6101 | Operating System Concepts | * To make students able to learn different types of operating systems along with concept of file systems and CPU scheduling algorithms used in operating system.
* To provide students knowledge of memory management and deadlock handling algorithms.
* At the end of the course, students will be able to implement various algorithms required for management, scheduling, allocation and communication used in operating system.
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| 2 | IT | 6102 | Data Communication Systems | * To understand the fundamental concepts of computer networking and provide the knowledge of different protocols at different layers of models.
* To understand the techniques used to share network bandwidth among the multiple users and provide the depth knowledge of DLL fundamentals.
* Learn how the data is transferred between the computers over the network.
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| 3 | IT | 6103 | Interactive Computer Graphics | * To provide comprehensive introduction about computer graphics system, design algorithms and two dimensional transformations.
* To make the students familiar with techniques of clipping, three dimensional graphics and three dimensional transformations.
* The computer graphics course prepares students for activities involving in design, development and testing of modeling, rendering, shading and animation.
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| 4 | IT | 6104 | Computer Architecture & Organization | * Study basic computer organization, design and micro-operations.
* Understanding of CPU functioning and computer arithmetic.
* Learning various methods and techniques of memory organization.
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| 5 | IT | 6151 | Operating System Concepts lab | * To make students able to implement CPU scheduling algorithms and Bankers algorithm used for deadlock avoidance and prevention.
* Students will also be able to implement page replacement and memory management algorithms.
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| 6 | IT | 6152 | Data Communication Systems lab | * To study transmission media and to realize and compare different LAN topologies.
* To implement and compare the performance of Data Link Layer protocols.
* The objective of this Lab is to understand the use of transmission media, network topologies and data link layer protocols.
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| 7 | IT | 6153 | Interactive Computer Graphics lab | * To implement various graphics drawing algorithms, 2D-3D transformations and clipping techniques.
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| **Semester IV** |
| 1 | IT | 6201 | Relational Database Management System | * Gain a good understanding of the architecture and functioning of database management systems as well as associated tools and techniques, principles of data modeling using entity relationship and develop a good database design and normalization techniques to normalize a database.
* Understand the use of structured query language and its syntax, transactions, database recovery and techniques for query optimization.
* Acquire a good understanding of database systems concepts and to be in a position to use and design databases for different applications.
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| 2 | IT | 6202 | Computer Networks & Security | * To explain how communication works in computer networks and to understand the basic terminology of computer networks
* To explain the role of protocols in networking and to analyze the services and features of the various layers in the protocol stack.
* To understand design issues in Network Security and to understand security threats, security services and mechanisms to counter them.
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| 3 | IT | 6203 | Multimedia Technology | * To understand about various latest interactive multimedia devices, the basic concepts about images and image formats.
* To understand about data compression techniques, image compression techniques like JPEG, video compression techniques like MPEG, and the basic concepts about animation.
* To develop an interactive multimedia presentation by using multimedia devices and identify theoretical and practical aspects in designing multimedia applications surrounding the emergence of multimedia technology.
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| 4 | IT | 6251 | Relational Database Management System lab | * Understand, analyze and apply common SQL statements including DDL, DML and DCL statements to perform different operations.
* Design different views of tables for different users and to apply embedded and nested queries.
* Design and implement a database for a given problem according to well known design principles that balance data retrieval performance with data consistency.
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| 5 | IT | 6252 | Computer Networks & Security lab | * To make students aware about various types of cables used in guided media like coaxial cable, optical fiber cable, twisted pair cables and its categories.
* To understand the working of LAN Card, Hub, TELNET and to understand the working difference between straight cable and cross over cable.
* To be able to analyze different protocols used for packet communication like ALOHA Protocol.
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| **Semester V** |
| 1 | IT | 7101 | Software Project Management | * Carry out an evaluation and selection of projects against strategic, technical and economic criteria and use a variety of cost benefit evaluation techniques for choosing among competing project proposals. Approach project planning in an organized step by step manner and select an appropriate process model produce an activity plan for a project.
* Identify project risks, monitor and track project deadlines and produce a work plan and resource schedule.
* Plan the evaluation of a proposal or a product and manage people in software environments. Understand the importance of teamwork and quality management in software project management. Apply these project management tools and techniques in a diversity of fields such as new product and process development, construction, information technology, health care, and applied research.
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| 2 | IT | 7102 | Web Application Engineering | * understand, analyze and apply the role languages like HTML, CSS, XML, JavaScript and protocols in the workings of web and web applications.
* understand about network and security programming using Java and know about the application of dynamic page functionality in web pages using CGI, Servlets, JSP, ASP.
* create and communicate between client and server using Java and create a good, effective and dynamic website.
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| 3 | IT | 7103 | Enterprise Resource Planning | * To make students able to learn fundamental concepts of ERP system and ERP related technologies.
* To provide students knowledge of different ERP modules and manufacturing perspectives of ERP.
* At the end of the course, students will be able to use ERP system in different business organizations by having knowledge of latest scenario of ERP market in e-business.
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| 4 | IT | 7151 | Software Project Management lab | * Learn the software life cycle phases (project management, requirements engineering, software design, prototyping and testing). Create and specify a software design based on the requirement specification that the software can be implemented based on the design.
* Get familiar with UML (modeling language for analysis and design).
* Make a testing plan for the software.
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| 5 | IT | 7152 | Web Application Engineering lab | * Create a static website using HTML and add dynamic functionality to it by using java Script.
* Implement the advanced concepts of java such as servelets & jsp to create dynamic web pages & add functionality to the WebPages by using XML.
* Gain confidence to create dynamic website on real world problems.
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| 6 | IT | 7160 | Seminar & Group Discussion | * Provides opportunity for students to develop skills in presentation and discussion of research topics in a public forum.
* Provides students with exposure to a variety of research projects and activities in order to enrich their academic experience.
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| 7 | IT | 7170 | Minor Project | * To understand the programming language concepts and basics of Software Development Life Cycle model for the implementation of the project.
* To plan, analyze, design and implement a software project using SDLC model.
* learn to work as a team and to focus on getting a working project done within a stipulated period of time.
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| **ELECTIVE-I** |
| 1 | CS | 7104A | Advance Database Management Systems | * To understand the basic concepts regarding database, know about query processing and techniques involved in query optimization and understand the concepts of database transaction and related database facilities including concurrency control, backup and recovery.
* To understand the introductory concepts of some advanced topics in data management like distributed databases, data warehousing, deductive databases and be aware of some advanced databases like partial multimedia and mobile databases.
* To understand the difference between DBMS and advanced DBMS and use of advanced database concepts and become proficient in creating database queries.
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| 2 | CS | 7104B | Cryptography | * This course builds on the overview about information security, which includes an overview of public and secret key cryptosystems.
* Comprehend and apply authentication services and mechanisms.
* On completion of this course students will be able to apply the knowledge and skills obtained to study further concepts in information security
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| 3 | IT | 7104 A | Object Oriented Modeling and Design | * To understand the concept of object-oriented development, and create a static object model and a dynamic behavioral model and a functional model of the system.
* To understand the approaches to system design and object design, and the techniques of translating design to implementation.
* To implement the object-oriented modeling and design patterns to provide solutions to the real-world software design problems.
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| 4 | CS | 7104D | Embedded Systems | * To introduce the embedded Hardware and Interfacing.
* To make the students familiar with software development & tools for embedded systems.
* The objective of the course is to cover the Hardware Design, Software Development & RTOS for the Embedded Systems.
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| 5 | CS | 7104E | Natural Language Processing | * Upon the successful completion of this course, the students will be able to:
* To understand the approaches to syntax and semantics in Natural Language Processing, the various types of language processors, the elements of formal language theory, the types of grammar, and the computational morphology.
* To understand the basic parsing strategies for context-free grammars, the data structures and algorithms for parsing, and the approaches to ambiguity resolution, generation and dialogue.
* explain and apply the fundamental algorithms and techniques in the area of Natural Language Processing.
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| **ELECTIVE-II** |
| 1 | CS | 7105A | Operating System Internals | * To make the students familiar with architecture of UNIX and windows operating system along with internal representation of files.
* To provide the students knowledge of process control and memory management policies.
* At the end of the course, students will be able to implement different algorithms used for representation, scheduling, allocation and management in operating system.
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| 2 | IT | 7105A | Distributed Computing | * Study software components of distributed computing systems. Know about the communication and interconnection architecture of multiple computer systems.
* Recognize the inherent difficulties that arise due to distributed-ness of computing esources. Understanding of networks & protocols, mobile & wireless computing and their applications to real world problems.
* At the end students will be familiar with the design, implementation and security issues of distributed system.
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| 3 | CS | 7105B | Real Time Systems | * understand the basic concepts and characteristics of real-time systems, assess the difference between hard and soft real-time systems, task models, and common approaches to real-time scheduling.
* understand the practical considerations, implementation, pros and cons of clock-driven scheduling, priority scheduling and multiprocessor scheduling, resource access control and synchronization, and models of real-time communication.
* understand the principles behind the implementation of real-time systems and the importance of time to computing systems.
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| 4 | IT | 7105B | Client Server Architecture | * To introduce the client server architecture and fundamentals of distributed systems.
* To make students familiar with Distributed computing environment, RMI and DCOM architecture.
* The objective of the course is to understand Distributed Systems, distributed computing environment, RMI, DCOM architecture and CORBA architecture.
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| 5 | CS | 7105C | Fault Tolerant Computing | * To the widely applicable area of reliable and fault tolerant computing.
* To understand the techniques to model faults and know how to generate tests and evaluate effectiveness.
* To evaluate reliability of systems with permanent and temporary faults. Assess the relation between software testing and residual defects and security vulnerabilities
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| **Semester VI** |
| 1 | IT | 7201 | Intelligent Information System | * Understand the framework of MIS organization and approaches in development of MIS. Understand the basics of data representation and the computer hardware required in information system. Apply the criteria for Investment in hardware and software to solve practical problems.
* Know the role of software in problem solving and applications of expert system and neural networks. Design the important components to support the decision making processes in an Executive Support system. Apply the latest techniques in artificial and computational intelligence that can be used to facilitate decision making processes. Understand office automation.
* Possess the knowledge to evaluate the different commercially available or public domain tools that can be used to tackle specific problems related to business decision making. Possess the ability to understand and decide if future new techniques in artificial and computational intelligence can be used to solve different practical business problems.
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| 2 | IT | 7202 | Cyber Laws & IPR | * To understand the concept of cyber space, netizens and various types of cyber crimes.
* To study Legal aspects of E-Commerce, IPR and Domain Name resolution.
* Discuss scope and limitations of IT Act of India
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| 3 | IT | 7251 | Intelligent Information System lab | * Get familiar with different types of information systems and methodologies of developing information systems (eg MIS).
* Work in the fields of decision support systems, executive information systems, neural networks and expert systems.
* Perform performance measurement, multi-criteria decision making, knowledge management, data analysis and data mining. Evaluate information systems and the social and security issues involved.
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| 4 | IT | 7270 | Major Project | * learn about different software development process models and software engineering principles and develop an ability to a apply them to software design of real life problems.
* plan, analyze, design and implement a software project using programming languages like Java, ASP, PHP etc.
* gain confidence at having conceptualized, designed and implemented a working major project with their team.
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| **ELECTIVE-III** |
| 1 | CS | 7203A | Digital Image Processing | * understand the mathematical foundations for digital image representation, image acquisition, image transformation, and image enhancement.
* understand the mathematical principles of image restoration, image compression, and image segmentation.
* develop a theoretical foundation of fundamental concepts of digital image processing.
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| 2 | CS | 7203B | Software Reliability & Testing | * Understand the concept of reliability and access the difference between H/W & S/W reliability and evaluate different S/W engineering technologies.
* Understand and anticipate the possible causes of failure and knowledge of how to prevent them.
* Analyze and test a S/W system, when it is evolved to accommodate a set of change requirements such as adding new functionalities, bug fixing etc.
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| 3 | IT | 7203A | Data Mining & Warehousing | * To understand the basic principles, concepts and applications of data warehousing and data mining,
* Ability to do Conceptual, Logical, and Physical design of Data Warehouses OLAP applications and OLAP deployment
* Have a   good knowledge of the fundamental concepts that provide the foundation of data mining.
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| 4 | IT | 7203B | Visual Programming | * Students will be able to learn visual programming basics and its components.
* To make the students familiar with Socket Programming and Window Programming.
* The objective of the course is to cover visual programming skills needed for modern software development
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| 5 | CS | 7203C | Network Programming | * To understand the use of client/server architecture, inter process communication and to explain the basic communication protocols.
* To understand elementary socket system calls, advanced socket system calls and Java Socket API and to explain the basic concepts relating to TCP and UDP based sockets.
* To understand File transfer protocol, remote login using pseudo terminal and RPC.
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| **ELECTIVE-IV** |
| 1 | CS | 7204A | Mobile and Cellular Technologies | * To provide the student with an understanding of the Cellular concept, Frequency reuse, Hand-off strategies.
* To provide the student with an understanding of Equalization and diversity reception techniques
* To give the student an understanding of digital cellular systems (GSM, GPRS, WAP, cdma2000, and W-CDMA)
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| 2 | CS | 7204B | Simulation & Modeling | * To build simple models and understand the critical modeling assumptions.
* Apply statistic, testing and probability knowledge to simulation application.
* Learn the simulation methods and tools for modeling & simulation of continuous, discrete and combined systems using simulation language.
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| 3 | CS | 7204C | Operations Research | * Use the knowledge of operations research to solve problems like linear programming problem (LPP), transportation problem and assignment problem.
* Understand different application areas of operations research like maximum flow problem, shortest path problem, game theory and queuing theory.
* Succeed in stating whether a problem can be solved using operations research and solving problems using techniques of operations research.
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| 4 | CS | 7204D | Distributed Operating Systems | * understand the hardware and software concepts of distributed operating systems, various design issues like transparency, flexilibity etc., and communication and synchronization in distributed operating systems.
* understand scheduling in distributed operating systems, fault tolerance, real-time distributed systems, and designing of distributed file systems.
* understand the concept of design and implementation in the context of distributed operating systems.
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| 5 | CS | 7204E | Soft Computing | * Understand basics of fuzzy system, genetic algorithms & their relations.
* Learn artificial neural n/ws, models 7 their functions.
* Apply genetic algorithms & artificial neural N/ws as computation tools to solve a variety of problems in various areas of interest ranging from optimization problems to text analytics.
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