

COMPUTER SCIENCE AND ENGINEERING

COURSE CODE	15PCD13/23-PROGRAMMING IN C AND DATA STRUCTURES
CO1	Achieve Knowledge of design and development of C problem solving skills
CO2	Understand the basic principles of Programming in C language
CO3	Design and develop modular programming skills.
CO4	Effective utilization of memory using pointer technology
CO5	Understands the basic concepts of pointers and data structures
COURSE CODE	15CPL16/26-COMPUTER PROGRAMMING LABORATORY
CO1	Gaining Knowledge on various parts of a computer.
CO2	Able to draw flowcharts and write algorithms
CO3	Able design and development of C problem solving skills.
CO4	Able design and develop modular programming skills.
CO5	Able to trace and debug a program
COURSE CODE	15CS32-ANALOG AND DIGITAL ELECTRONICS
CO1	Explain the operation of JFETs and MOSFETs , Operational Amplifier circuits and their application
CO2	Explain Combinational Logic, Simplification Techniques using Karnaugh Maps, Quine McClusky technique.
CO3	Demonstrate Operation of Decoders, Encoders, Multiplexers, Adders and Subtractors, working of Latches, Flip-Flops, Designing Registers, Counters, A/D and D/A Converters
CO4	Design of Counters, Registers and A/D & D/A converters
COURSE CODE	15CS33-DATA STRUCTURES AND APPLICATIONS
CO1	Use different types of data structures, operations and algorithms
CO2	Apply searching and sorting operations on files
CO3	Use stack, Queue, Lists, Trees and Graphs in problem solving
CO4	Implement all data structures in a high-level language for problem solving.
COURSE CODE	15CS34-COMPUTER ORGANIZATION
CO1	Explain the basic organization of a computer system.
CO2	Demonstrate functioning of different sub systems, such as processor, Input/output, and memory.
CO3	Illustrate hardwired control and micro programmed control. pipelining, embedded and other computing systems.
CO4	Design and analyse simple arithmetic and logical units
COURSE CODE	15CS35-UNIX SHELL PROGRAMMING
CO1	Explain UNIX system and use different commands.
CO2	Write Shell scripts for certain functions on different subsystems.
CO3	Demonstrate use of editors and Perl script writing
COURSE CODE	15CS36-DISCRETE MATHEMATICAL STRUCTURES
CO1	Use propositional and predicate logic in knowledge representation and truth verification.
CO2	Demonstrate the application of discrete structures in different fields of computer science.
CO3	Solve problems using recurrence relations and generating functions.
CO4	Application of different mathematical proofs techniques in proving theorems in the courses.

CO5	Compare graphs, trees and their applications.
COURSE CODE	15CSL37-ANALOG AND DIGITAL ELECTRONICS LABORATORY
CO1	Use various Electronic Devices like Cathode ray Oscilloscope, Signal generators, Digital
CO2	trainer Kit, Multimeters and components like Resistors, Capacitors, Op amp and Integrated Circuit.
CO3	Design and demonstrate various combinational logic circuits.
CO4	Design and demonstrate various types of counters and Registers using Flip-flops
CO5	Use simulation package to design circuits.
CO6	Understand the working and implementation of ALU
COURSE CODE	15CSL38-DATA STRUCTURES LABORATORY
CO1	Analyze and Compare various linear and non-linear data structures
CO2	Code, debug and demonstrate the working nature of different types of data structures and their applications
CO3	Implement, analyze and evaluate the searching and sorting algorithms
CO4	Choose the appropriate data structure for solving real world problems
COURSE CODE	15CS42-SOFTWARE ENGINEERING
CO1	Design a software system, component, or process to meet desired needs within realistic constraints.
CO2	Assess professional and ethical responsibility
CO3	Function on multi-disciplinary teams
CO4	Use the techniques, skills, and modern engineering tools necessary for engineering practice
CO5	Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems.
COURSE CODE	15CS43-DESIGN AND ANALYSIS OF ALGORITHMS
CO1	Describe computational solution to well known problems like searching, sorting etc.
CO2	Estimate the computational complexity of different algorithms.
CO3	Devise an algorithm using appropriate design strategies for problem solving.
COURSE CODE	15CS44-MICROPROCESSORS AND MICROCONTROLLERS
CO1	Differentiate between microprocessors and microcontrollers
CO2	Design and develop assembly language code to solve problems
CO3	Gain the knowledge for interfacing various devices to x86 family and ARM processor
CO4	Demonstrate design of interrupt routines for interfacing devices
COURSE CODE	15CS45-OBJECT ORIENTED CONCEPTS
CO1	Explain the object-oriented concepts and JAVA.
CO2	Develop computer programs to solve real world problems in Java.
CO3	Develop simple GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles using Applets and swings
COURSE CODE	15CS46-DATA COMMUNICATION
CO1	Illustrate basic computer network technology.
CO2	Identify the different types of network topologies and protocols.
CO3	Enumerate the layers of the OSI model and TCP/IP functions of each layer.
CO4	Make out the different types of network devices and their functions within a network
CO5	Demonstrate the skills of subnetting and routing mechanisms.
COURSE CODE	15CSL-47DESIGN AND ANALYSIS OF ALGORITHM LABORATORY

CO1	Design algorithms using appropriate design techniques (brute-force, greedy, dynamic programming, etc.)
CO2	Implement a variety of algorithms such as sorting, graph related, combinatorial, etc., in a high level language.
CO3	Analyze and compare the performance of algorithms using language features.
CO4	Apply and implement learned algorithm design techniques and data structures to solve real world problems
COURSE CODE	15CSL48-MICROPROCESSOR AND MICROCONTROLLER LABORATORY
CO1	Learn 80 x86 instruction sets and gain the knowledge of how assembly language works.
CO2	Design and implement programs written in 80x86 assembly language
CO3	Know functioning of hardware devices and interfacing them to x86 family
CO4	Choose processors for various kinds of applications.
COURSE CODE	15CS51-MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY
CO1	Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship
CO2	Utilize the resources available effectively through ERP
CO3	Make use of IPRs and institutional support in entrepreneurship
COURSE CODE	15CS52-COMPUTER NETWORKS
CO1	Explain principles of application layer protocols
CO2	Recognize transport layer services and infer UDP and TCP protocols
CO3	Classify routers, IP and Routing Algorithms in network layer
CO4	Understand the Wireless and Mobile Networks covering IEEE 802.11 Standard
CO5	Describe Multimedia Networking and Network Management
COURSE CODE	15CS53-DATABASE MANAGEMENT SYSTEM
CO1	Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS.
CO2	Use Structured Query Language (SQL) for database manipulation.
CO3	Design and build simple database systems
CO4	Develop application to interact with databases
COURSE CODE	15CS54-AUTOMATA THEORY AND COMPUTABILITY
CO1	Acquire fundamental understanding of the core concepts in automata theory and Theory of Computation
CO2	Learn how to translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).
CO3	Design Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.
CO4	Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.
CO5	Classify a problem with respect to different models of Computation.
COURSE CODE	15CS551-OBJECT ORIENTED MODELING AND DESIGN
CO1	Describe the concepts of object-oriented and basic class modelling.
CO2	Draw class diagrams, sequence diagrams and interaction diagrams to solve problems
CO3	Choose and apply a befitting design pattern for the given problem.
COURSE CODE	15CS565-CLOUD COMPUTING
CO1	Explain the concepts and terminologies of cloud computing

CO2	Demonstrate cloud frameworks and technologies
CO3	Define data intensive computing
CO4	Demonstrate cloud applications
COURSE CODE	15CSL57-COMPUTER NETWORK LABORATORY
CO1	Analyze and Compare various networking protocols.
CO2	Demonstrate the working of different concepts of networking.
CO3	Implement, analyze and evaluate networking protocols in NS2 / NS3
COURSE CODE	15CSL58-DBMS LABORATORY WITH MINI PROJECT
CO1	Create, Update and query on the database.
CO2	Demonstrate the working of different concepts of DBMS
CO3	Implement, analyze and evaluate the project developed for an application
COURSE CODE	15CS61-CRYPTOGRAPHY, NETWORK SECURITY AND CYBER LAW
CO1	Discuss cryptography and its need to various applications
CO2	Design and develop simple cryptography algorithms
CO3	Understand cyber security and need cyber Law
COURSE CODE	15CS62-COMPUTER GRAPHICS AND VISUALIZATION
CO1	Design and implement algorithms for 2D graphics primitives and attributes.
CO2	Illustrate Geometric transformations on both 2D and 3D objects.
CO3	Apply concepts of clipping and visible surface detection in 2D and 3D viewing, and Illumination Models.
CO4	Decide suitable hardware and software for developing graphics packages using OpenGL
COURSE CODE	15CS63-SYSTEM SOFTWARE AND COMPILER DESIGN
CO1	Explain system software such as assemblers, loaders, linkers and macroprocessors
CO2	Design and develop lexical analyzers, parsers and code generators
CO3	Utilize lex and yacc tools for implementing different concepts of system software
COURSE CODE	15CS64-OPERATING SYSTEMS
CO1	Demonstrate need for OS and different types of OS
CO2	Apply suitable techniques for management of different resources
CO3	Use processor, memory, storage and file system commands
CO4	Realize the different concepts of OS in platform of usage through case studies
COURSE CODE	15CS653-OPERATIONS RESEARCH
CO1	Select and apply optimization techniques for various problems.
CO2	Model the given problem as transportation and assignment problem and solve.
CO3	Apply game theory for decision support system.
COURSE CODE	15CS666-MULTI-CORE ARCHITECTURE AND PROGRAMMING
CO1	Identify the issues involved in multicore architectures
CO2	Explain fundamental concepts of parallel programming and its design issues
CO3	Solve the issues related to multiprocessing and suggest solutions
CO4	Point out the salient features of different multicore architectures and how they exploit parallelism
CO5	Illustrate OpenMP and programming concept
COURSE CODE	15CSL67-SYSTEM SOFTWARE AND OPERATING SYSTEM LAB
CO1	Implement and demonstrate Lexer's and Parser's
CO2	Evaluate different algorithms required for management, scheduling, allocation and communication used in operating system.
COURSE CODE	15CSL68-COMPUTER GRAPHICS LABORATORY WITH MINI PROJECT

CO1	Apply the concepts of computer graphics
CO2	Implement computer graphics applications using OpenGL
CO3	Animate real world problems using OpenGL
COURSE CODE	15CS71-WEB TECHNOLOGY AND ITS APPLICATIONS
CO1	Adapt HTML and CSS syntax and semantics to build web pages.
CO2	Construct and visually format tables and forms using HTML and CSS
CO3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
CO4	Appraise the principles of object oriented development using PHP
CO5	Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features.
COURSE CODE	15CS72-ADVANCED COMPUTER ARCHITECTURES
CO1	Explain the concepts of parallel computing and hardware technologies
CO2	Compare and contrast the parallel architectures
CO3	Illustrate parallel programming concepts
COURSE CODE	15CS73-MACHINE LEARNING
CO1	Identify the problems for machine learning. And select the either supervised, unsupervised or reinforcement learning.
CO2	Explain theory of probability and statistics related to machine learning
CO3	Investigate concept learning, ANN, Bayes classifier, k nearest neighbor, Q,
COURSE CODE	15CS743-INFORMATION AND NETWORK SECURITY
CO1	Analyze the Digital security lapses
CO2	Illustrate the need of key management
COURSE CODE	15CS754-STORAGE AREA NETWORKS
CO1	Identify key challenges in managing information and analyze different storage networking technologies and virtualization
CO2	Explain components and the implementation of NAS
CO3	Describe CAS architecture and types of archives and forms of virtualization
CO4	Illustrate the storage infrastructure and management activities
COURSE CODE	15CSL76-MACHINE LEARNING LABORATORY
CO1	Understand the implementation procedures for the machine learning algorithms.
CO2	Design Java/Python programs for various Learning algorithms.
CO3	Apply appropriate data sets to the Machine Learning algorithms.
CO4	Identify and apply Machine Learning algorithms to solve real world problems
COURSE CODE	WEB TECHNOLOGY LABORATORY WITH MINI PROJECT
CO1	Design and develop dynamic web pages with good aesthetic sense of designing and latest technical know-how's.
CO2	Have a good understanding of Web Application Terminologies, Internet Tools other web services.
CO3	Learn how to link and publish web sites
COURSE CODE	15CS81-INTERNET OF THINGS TECHNOLOGY
CO1	Interpret the impact and challenges posed by IoT networks leading to new architectural models.
CO2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.
CO3	Appraise the role of IoT protocols for efficient network communication.
CO4	Elaborate the need for Data Analytics and Security in IoT.

CO5	Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry
COURSE CODE	15CS82-BIG DATA ANALYTICS
CO1	Master the concepts of HDFS and MapReduce framework
CO2	Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop Administration
CO3	Recognize the role of Business Intelligence, Data warehousing and Visualization in decision making
CO4	Infer the importance of core data mining techniques for data analytics
CO5	Compare and contrast different Text Mining Techniques
COURSE CODE	15CS833-NETWORK MANAGEMENT
CO1	Analyze the issues and challenges pertaining to management of emerging network technologies such as wired/wireless networks and high-speed internets.
CO2	Apply network management standards to manage practical networks
CO3	Formulate possible approaches for managing OSI network model.
CO4	Use on SNMP for managing the network
CO5	Use RMON for monitoring the behavior of the network
CO6	Identify the various components of network and formulate the scheme for the managing them