COMPUTER SCIENCE AND ENGINEERING

COURSE CODE	17PCD13/23-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	**17CPL16/26-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	**17CS32-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,
CO4	Flip-Flops, Designing Registers, Counters, A/D and D/A Converters
CO5	Design of Counters, Registers and A/D & D/A converters
COURSE CODE	**17CS33-DATA STRUCTURES AND APPLICATIONS**
CO1	Explain different types of data structures, operations and algorithms
CO2	Apply searching and sorting operations on files
CO3	Make use of stack, Queue, Lists, Trees and Graphs in problem solving.
CO4	Develop all data structures in a high-level language for problem solving.
COURSE CODE	**17CS34-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	Build simple arithmetic and logical units
COURSE CODE	**17CS35-UNIX AND SHELL PROGRAMMING**
CO1	Explain UNIX system and use different commands.
CO2	Compile Shell scripts for certain functions on different subsystems.
CO3	Demonstrate use of editors and Perl script writing
COURSE CODE	**17CS36-DISCRETE MATHEMATICAL STRUCTURES**
CO1	Make use of 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	Apply different mathematical proofs, techniques in proving theorems.
CO5	Compare graphs, trees and their applications.

COURSE CODE	17CSL37-ANALOG AND DIGITAL ELECTRONICS LABORATORY
CO1	Demonstrate various Electronic Devices like Cathode ray Oscilloscope, Signal generators, Digital Trainer Kit, Multimeters and components like Resistors, Capacitors, Op amp and Integrated Circuit.
CO2	Design and demonstrate various combinational logic circuits.
CO3	Design and demonstrate various types of counters and Registers using Flip-flops
CO4	Make use of simulation package to design circuits.
CO5	Infer the working and implementation of ALU.
COURSE CODE	17CSL38-DATA STRUCTURES LABORATORY
CO1	Analyze and Compare various linear and non-linear data structures
CO2	Demonstrate the working nature of different types of data structures and their applications
CO3	Develop, analyze and evaluate the searching and sorting algorithms
CO4	Choose the appropriate data structure for solving real world problems
COURSE CODE	17CS42-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 int erfaces for a computer program to interact with users, and to comprehend the event-based GUI handling principles using Applets and swings.
COURSE CODE	17CS43-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	Develop an algorithm using appropriate design strategies for problem solving.
COURSE CODE	17CS44-MICROPROCESSORS AND MICROCONTROLLERS
CO1	Differentiate between microprocessors and microcontrollers
CO2	Develop assembly language code to solve problems
CO3	Explain interfacing of various devices to x86 family and ARM processor
CO4	Demonstrate interrupt routines for interfacing devices
COURSE CODE	17CS45-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	Make use of techniques, skills, and modern engineering tools necessary for engineering practice
CO5	Comprehend software systems or parts of software systems
COURSE CODE	17CS46-DATA COMMUNICATION
CO1	Illustrate basic computer network technology.
CO2	Identify the different types of network topologies and protocols.
CO3	List and explain the layers of the OSI model and TCP/IP model.
CO4	Comprehend the different types of network devices and their functions within a network
CO5	Demonstrate subnetting and routing mechanisms.
COURSE CODE	17CSL47-DESIGN AND ANALYSIS OF ALGORITHM LABORATORY
CO1	Design algorithms using appropriate design techniques (brute-force, greedy, dynamic programming, etc.)

CO2	Develop 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 structuresto solve real-world problems.
COURSE CODE	**17CSL48-MICROPROCESSOR AND MICROCONTROLLER LABORATORY**
CO1	Summarize 80x86 instruction sets and comprehend the knowledge of how assembly language works.
CO2	Design and develop assembly programs using 80x86 assembly language instructions
CO3	Infer functioning of hardware devices and interfacing them to x86 family
CO4	Choose processors for various kinds of applications.
COURSE CODE	**17CS51-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	**17CS52-COMPUTER NETWORKS**
CO1	Explain principles of application layer protocols
CO2	Outline transport layer services and infer UDP and TCP protocols
CO3	Classify routers, IP and Routing Algorithms in network layer
CO4	Explain the Wireless and Mobile Networks covering IEEE 802.11 Standard
CO5	Define Multimedia Networking and Network Management
COURSE CODE	**17CS53-DATABASE MANAGEMENT SYSTEM**
CO1	Summarize the concepts of database objects; enforce integrity constraints on a database using RDBMS.
CO2	Use Structured Query Language (SQL) for database manipulation.
CO3	Design simple database systems
CO4	Design code for some application to interact with databases.
COURSE CODE	**17CS54-AUTOMATA THEORY AND COMPUTABILITY**
CO1	Tell the core concepts in automata theory and Theory of Computation
CO2	Explain how to translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).
CO3	Interpret 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	**17CS551-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	**17CS565-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	**17CSL57-COMPUTER NETWORK LABORATORY**
CO1	Analyze and Compare various networking protocols.
CO2	Demonstrate the working of different concepts of networking.
CO3	Implement and analyze networking protocols in NS2 / NS3
COURSE CODE	**17CSL58-DBMS LABORATORY WITH MINI PROJECT**
CO1	Use Structured Query Language (SQL) for database Creation and manipulation.
CO2	Demonstrate the working of different concepts of DBMS
CO3	Implement and test the project developed for an application.
COURSE CODE	**17CS61-CRYPTOGRAPHY, NETWORK SECURITY AND CYBER LAW**
CO1	Discuss the cryptography and its need to various applications
CO2	Design and Develop simple cryptography algorithms
CO3	Understand the cyber security and need cyber Law
COURSE CODE	**17CS62-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	Understand the concepts of clipping and visible surface detection in 2D and 3D viewing, and Illumination Models.
CO4	Discussabout suitable hardware and software for developing graphics packages using OpenGL
COURSE CODE	**17CS63-SYSTEM SOFTWARE AND COMPILER DESIGN**
CO1	Illustrate system software such as assemblers, loaders, linkers and macroprocessors
CO2	Design and develop lexical analyzers, parsers and code generators
CO3	Discuss about lex and yacc tools for implementing different concepts of system software
COURSE CODE	**17CS64-OPERATING SYSTEMS**
CO1	Demonstrate need for OS and different types of OS
CO2	Discuss suitable techniques for management of different resources
CO3	Illustrate processor, memory, storage and file system commands
CO4	Explain the different concepts of OS in platform of usage through case studies
COURSE CODE	**17CS653-OPERATIONS RESEARCH**
CO1	Explain optimization techniques for various problems.
CO2	Understand the given problem as transportation and assignment problem and solve.
CO3	Illustrate game theory for decision support system.
COURSE CODE	**17CS666-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	Discuss salient features of different multicore architectures and how they exploit parallelism
CO5	Illustrate OpenMP and programming concept
COURSE CODE	**17CSL67-SYSTEM SOFTWARE AND OPERATING SYSTEM LABORATORY**
CO1	Implement and demonstrate Lexer's and Parser's
CO2	Implement different algorithms required for management, scheduling, allocation and communication used in operating system.

COURSE CODE	17CSL68-COMPUTER GRAPHICS LABORATORY WITH MINI PROJECT
CO1	Apply the concepts of computer graphics
CO2	Implement computer graphics applications using OpenGL
CO3	Implement real world problems using OpenGL
COURSE CODE	**17CS71-WEB TECHNOLOGY AND ITS APPLICATIONS**
CO1	Define HTML and CSS syntax and semantics to build web pages.
CO2	Understand the concepts of Construct , visually format tables and forms using HTML using CSS
CO3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
CO4	List the principles of object oriented development using PHP
CO5	Illustrate JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features
COURSE CODE	**17CS72-ADVANCED COMPUTER ARCHITECTURES**
CO1	Understand the concepts of parallel computing and hardware technologies
CO2	Illustrate and contrast the parallel architectures
CO3	Recall parallel programming concepts
COURSE CODE	**17CS73-MACHINE LEARNING**
CO1	Recall the problems for machine learning. And select the either supervised, unsupersvised or reinforcement learning.
CO2	Understand theory of probability and statistics related to machine learning
CO3	Illustrate concept learning, ANN, Bayes classifier, k nearest neighbor, Q,
COURSE CODE	**17CS743-INFORMATION AND NETWORK SECURITY**
CO1	Analyze the Digitals security lapses
CO2	Illustrate the need of key management
COURSE CODE	**17CS754-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	**17CSL76-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	**17CSL77-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	Understand the concepts of Web Application Terminologies, Internet Tools other web services.
CO3	Recall how to link and publish web sites
COURSE CODE	**17CS81-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	**17CS82-BIG DATA ANALYTICS**
CO1	Explain the concepts of HDFS and MapReduce framework
CO2	Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop
CO3	Administration
CO4	Recognize the role of Business Intelligence, Data warehousing and Visualization in decision making
CO5	Infer the importance of core data mining techniques for data analytics
CO6	Compare and contrast different Text Mining Techniques
COURSE CODE	**17CS833-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	Infer SNMP for managing the network
CO5	Infer RMON for monitoring the behavior of the network
CO6	Identify the various components of network and formulate the scheme for the managing them