



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
2017 SCHEME-CO's

Course Code	Course Name	CO Number	Course Outcome
17MAT31	ENGINEERING MATHEMATICS-III	CO1	Know the use of periodic signals and Fourier series to analyze circuits and system communication.
		CO2	Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier transforms and Z-transform.
		CO3	Employ appropriate Numerical methods to solve algebraic and transcendental equations.
		CO4	Apply Greens theorem, Divergence theorem and Stokes theorem in various applications in the field of elector-magnetic and gravitational fields and fluid flow problems.
		CO5	Determine the externals of functionals and solve the simple problems of the calculus of variations.
17CS32	ANALOG AND DIGITAL ELECTRONICS	CO1	Understand the fundamental concepts and techniques used in digital electronics.
		CO2	Understand and examine the structure of various number systems and its application in digital design.
		CO3	Understand, analyze and design various combinational and sequential circuits.
		CO4	Understand the simplification of Algebraic Expressions using Q-M method.
		CO5	Design Decoders, Multiplexers, De-multiplexer, Comparators, and latches.
17CS33	DATA STRUCTURES AND APPLICATIONS	CO1	Understanding the linear and non-linear data structures
		CO2	Implementing Sorting and searching operations, File structures.
		CO3	Implement Applications of Linked lists – Polynomials, Sparse matrix representation
		CO4	Implement all the applications of Data structures in a high-level language.
		CO5	Design and apply appropriate data structures for solving computing problems
17CS34	COMPUTER ORGANIZATIONS	CO1	Acquire knowledge of the basic structure of computers & machine instructions and programs, Addressing Modes, Assembly Language, Stacks, Queues and Subroutines.

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		CO2	Acquire knowledge of Memory system basic Concepts, Semiconductor RAM Memories, Static memories, Asynchronous DRAMS, Read Only Memories, Cache Memories and Virtual Memories.
		CO3	Acquire knowledge of Some Fundamental Concepts of Basic Processing Unit, Execution of a Complete Instruction, Multiple Bus Organization, Hardwired Control and Micro programmed Control.
		CO4	Apply the knowledge gained in the design of Computer. Design and evaluate performance of memory systems
		CO5	Understand the importance of life-long learning
17CS35	UNIX AND SHELL PROGRAMMING	CO1	Explain multi user OS UNIX and its basic features
		CO2	Design and develop shell programming.
		CO3	Design and develop communication terminology.
		CO4	Design and develop UNIX File I/O and UNIX Processes
		CO5	Perl script writing
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.
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	Understand the simplification of Algebraic Expressions using K-Map and design Adder, Subtractor & Multiplexers.
		CO3	Design and demonstrate the various types of converters, Parity generators.
		CO4	Understand the simulation package to design circuits
		CO5	Design and demonstrate various types of counters
17CSL38	DATA STRUCTURES LABORATORY	CO1	Analyze and Compare various linear and non-linear data structures

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		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
		CO5	Solve problem involving graphs, trees and heaps
17KKM39/49	KANNADA MANASU	CO1	Understand Kannada as administrative Language, Patra Vyavahara & Kannada vyakarana.
		CO2	Become Familiar about Da. Ra. Bendre, Dr. Sir. M Vishveshvaraya, Shivarama Karanth & Kuvempu.BGL Swamy.
		CO3	Collected information about poets & Authors like Triveni, Su. Ram Ekkundi, P Lankesh, K.P Poornachandra Tejaswi Gandhi story by Besagara halli Ramanna.
		CO4	Analyse the works of Belgiya haadu by Siddalingaiah, Ella hudugiyara kanassu & story Neeru.
		CO5	Understand Parisara Lekhana, Vrutthi shikshanadalli Kannada madyama & Konave gowda.
17KKL39/49	KANNADA KALI	CO1	To Read and understand the simple words in Kannada language, meaning in English ,equivalent words in english, grammar, form the sentences in kannada language, dialogue creation, learn about epics.
		CO2	To learn Kannada for Communication ,enquiries, sentence formation, request writing, conversations and meaning in English, adjectives.
		CO3	To learn creating present tense kannada sentences, potential forms, no-past continuous , imperative, understanding and answering.
		CO4	Learn to form Past tense sentences, discussing about a film, describing brindavan garden.
		CO5	To learn to converse routine activities of a student, grammar, present, past and perfect negations, reflexive, telephonic conversations, and to create some interest on Kannada Language and Literature.
17MAT41	ENGINEERING MATHEMATICS-IV	CO1	Solve first order ordinary differential equation arising in flow problems using single step and multi-step numerical methods.



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		CO2	Solve second order ordinary differential equation arising in flow problems using single step numerical methods and Illustrate problems of potential theory, quantum mechanics and heat conduction by employing notions and properties of Bessel's functions and Legendre's polynomials.
		CO3	Explain the concepts of analytic functions, residues, poles of complex potentials and describe conformal and Bilinear transformation arising in field theory and signal processing.
		CO4	Develop probability distribution of discrete, continuous random variables and joint probability distribution occurring in digital signal processing, information theory and design engineering.
		CO5	Demonstrate testing of hypothesis of sampling distributions and illustrate examples of Markov chains related to discrete parameter stochastic process.
17CS42	OBJECT ORIENTED CONCEPTS	CO1	Explain the Object –Oriented concepts and JAVA
		CO2	Develop computer programs to solve Object – Oriented programming, real world problems in Java
		CO3	Interpret and design the Classes, Exception Handling, Inheritances for resolving run-time errors and handle large data set using file I/O in Java
		CO4	Interpret and design the multithreaded programming, Event Handling for resolving run-time errors with Java programs
		CO5	Develop simple GUI interfaces for a computer program to interact with users, and to Comprehend the event-based GUI handling principles using Applets and Swings
17CS43	DESIGN AND ANALYSIS OF ALGORITHM	CO1	Define the methods and notations used to analyze efficiency of algorithm
		CO2	Illustrating computational solutions to problems like sorting, searching etc.. by different methods
		CO3	Using techniques like greedy method to solve graph, tree etc problems
		CO4	Applying the concept of dynamic programming to solve various problems
		CO5	Evaluating problems using backtracking, NP method etc.,

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17CS44	MICROPROCESSOR AND MICROCONTROLLER	CO1	Differentiate between microprocessors and microcontrollers, also can explain the fundamentals about microprocessors
		CO2	Develop assembly language code to solve problems
		CO3	Explain interfacing of various devices to x86 family
		CO4	Demonstrate interrupt routines for ARM
		CO5	Write programs using ARM instructions
17CS45	SOFTWARE ENGINEERING	CO1	Outline software engineering principles and activities involved in building large software programs.
		CO2	Identify ethical and professional issues and explain why they are of concern to software engineers.
		CO3	Describe the process of requirements gathering, requirements classification, requirements specification and requirements validation.
		CO4	Recognize the importance of software maintenance and describe the intricacies involved in software evolution.
		CO5	Apply estimation techniques, schedule project activities and compute pricing.
17CS46	DATA COMMUNICATION	CO1	Explain the functions of OSI & TCP/IP model , Identify the different types of network topologies and protocols
		CO2	Analyze the functions of physical layers& basic computer network Technology, Describe different types of switching network & Convert Data using different transmission techniques
		CO3	Detect and correct errors using different techniques and discuss various functions of data link layer protocols
		CO4	Analyze different media access control protocol& wired and wireless LAN Ethernet
		CO5	Demonstrate different types of wireless network & Discriminate IPV4 & IPV6
17CSL47	DESIGN AND ANALYSIS OF ALGORITHM LABORATORY	CO1	Design and implement various algorithms in JAVA
		CO2	Implement a variety of sorting algorithms such as quick sort and Merge sort.
		CO3	Design algorithms using appropriate design techniques (brute-force, greedy, dynamic programming, etc.
		CO4	Employ various design strategies and Algorithms for problem solving.



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		CO5	Implement a variety of algorithms such as graph related, combinatorial, etc., in a high level language.
17CSL48	MICROPROCESSORS LABORATORY	CO1	Describe the fundamental of assembly level programming of microprocessors and microcontroller
		CO2	Examine the programming proficiency using the various addressing modes and data transfer instruction of the target microprocessor/microcontroller
		CO3	To provide practical exposure to the students on design and coding knowledge on ARM.
		CO4	To give the knowledge and practical exposure on connectivity and execute of interfacing devices with 8086 kit like LED & LCD displays, Keyboards, Stepper Motors, DAC/ADC, and various other devices.
		CO5	To give the knowledge and practical exposure on connectivity and execute of interfacing devices with ARM kit like LED& LCD displays, Stepper Motors and various other devices.
17CPH39/49	Constitution of India, Professional Ethics and Human Rights	CO1	Learn in details with examples To assimilate and get familiarized with basic information about Indian constitution
		CO2	Specify in details with examples provide overall legal literacy to the young technocrats to manage complex societal issues in the present scenario.
		CO3	Learn the characteristics of To identify their individual roles and ethical responsibilities towards society.
		CO4	Specify in depth To understand engineering ethics & responsibilities
		CO5	Deliberate in details with application, if applicable, To understand engineering ethics & responsibilities, through the learning of these topics students will be able to understand human rights/values and its implications in their life.
17CS51	MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY	CO1	Define management, organization, entrepreneur, planning and staffing.
		CO2	Utilize the resources available effectively through ERP.
		CO3	Discuss the role of entrepreneur in economical development.

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		CO4	Explain the concept of Entrepreneur and its process (ERP).
		CO5	Make use of IPRs and institutional support in entrepreneurship.
17CS52	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
17CS53	DATABASE MANAGEMENT SYSTEM	CO1	Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS.
		CO2	Using Structured Query Language for database manipulation
		CO3	Design and build simple database systems
		CO4	Develop Application to interact with databases
		CO5	Understand the security mechanism of Database
17CS54	AUTOMATA THEORY AND COMPUTABILITY	CO1	Acquire fundamental core concepts in automata theory.
		CO2	Learn how to differentiate different models of computation.
		CO3	Design different grammars and automata for different language classes become knowledge about different model of computation.
		CO4	Develop skills in formal reasoning and reduction of a problem to a formal mode with an emphasize on semantic precision and consciousness.
		CO5	Classify problem with respect to different models of computation.
17CS552	INTRODUCTION TO SOFTWARE TESTING	CO1	Derive test cases for any given problem
		CO2	Compare the different testing techniques
		CO3	Classify the problem into suitable testing model
		CO4	Apply the appropriate technique for the design of flow graph.
		CO5	Create appropriate document for the software artefact
17CS5621	ARTIFICIAL INTELLIGENCE	CO1	Identify the AI based problems
		CO2	Learn basic knowledge representation through rules.



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		CO3	Define Symbolic Reasoning, Statistical reasoning and filters.
		CO4	Understand the Strong slot-and-filler structures .
		CO5	Discuss expert systems.
17CSL57	COMPUTER NETWORK LABORATORY	CO1	Able to Analyze the working of networking protocols using modern tool NS2.
		CO2	Able to Develop wired and wireless topology using XGraph, NAM in NS2.
		CO3	Able to Simulate and demonstrate the performance of GSM and CDMA.
		CO4	Able to Apply and develop the algorithms in data link layer, Network layer and application layer.
		CO5	Able to Design client-server applications using TCP and UDP socket IPC.
17CSL58	DBMS LABORATORY WITH MINI PROJECT	CO1	Develop an Entity Relationship model and create database for Library.
		CO2	Develop an Entity Relationship model and create database for Order.
		CO3	Develop an Entity Relationship model and create database for Movie.
		CO4	Develop an Entity Relationship model and create database for College.
		CO5	Develop an Entity Relationship model and create database for Company.
17CS61	CRYPTOGRAPHY, NETWORK SECURITY AND CYBER LAW	CO1	Discuss Cryptography and its need to various applications.
		CO2	Design and develop simple cryptography algorithms
		CO3	Illustrate key management issues and solutions
		CO4	Understand IEEE802.11 Wireless LAN Security
		CO5	Familiarize Cyber Security Law and Ethics
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	Apply concepts of clipping in 2D viewing and Illumination Models.
		CO4	Apply concepts of visible surface detection in 3D viewing.
		CO5	Infer the representation of curves and surfaces.
17CS63	SYSTEM SOFTWARE AND COMPILER DESIGN	CO1	Define and explain system software such as Assemblers and Macroprocessors
		CO2	Explain and implement Loaders and Linkers.



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		CO3	To introduce the major concept areas of language translation and in various phases of compiler and its use.
		CO4	To extend the knowledge of parser by parsing LL parser and LR parser.
		CO5	To enrich the knowledge in Syntax Directed Translation, Intermediate code generation and Code generation.
17CS64	OPERATING SYSTEMS	CO1	Familiar with multi-threading and understanding the process scheduling and process synchronization in CPU.
		CO2	Familiar with deadlocks, detection and recovery and evaluate the requirement for Describe and analyze the memory management
		CO3	Identify use and evaluate virtual memory management and file system.
		CO4	Familiar with Secondary storage disk and protection. Realize the different concepts of OS in platform of usage through case studies
		CO5	
17CS651	DATA MINING AND DATA WAREHOUSING	CO1	Understands data mining problems and implement the data warehouse
		CO2	Demonstrate the association rules for a given data pattern.
		CO3	Discuss between classification and clustering solution.
		CO4	Understand the analysis and modelling.
		CO5	Discuss dimension and Hierarchy
17CSL67	SYSTEM SOFTWARE AND OPERATING SYSTEM LABORATORY	CO1	To make students familiar with Lexical Analysis and Syntax Analysis phases of Compiler Design.
		CO2	To make students to implement programs on these phases using LEX & YACC tools and/or C/C++/Java.
		CO3	To enable students to learn different types of CPU scheduling algorithms used in the operating systems.
		CO4	To make students able to implement memory management - page replacement and deadlock handling algorithms.



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		CO5	To make students can utilize lex and yacc tools for implementing different concepts of system software.
17CSL68	COMPUTER GRAPHICS LABORATORY WITH MINI PROJECT	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 in 2D viewing and Illumination Models.
		CO4	Apply concepts of visible surface detection in 3D viewing.
		CO5	Infer the representation of curves and surfaces.
17CS71	WEB TECHNOLOGY AND ITS APPLICATIONS	CO1	Define HTML, CSS syntax and semantics to build web pages.
		CO2	Understand the concepts of Construct , visually format tables and forms using HTML using CSS
		CO3	Illustrate 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 · Illustrate JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features.
		CO5	Understand the concepts of HTML5 web storage and web based applications that can store data locally within the user's browser.
17CS72	ADVANCED COMPUTER ARCHITECTURES	CO1	Describe the general characteristics of computer architecture.
		CO2	Demonstrate the various Processors and Memory Architecture.
		CO3	Illustrate and contrast the parallel architectures.
		CO4	Build the various techniques in multi computers and multiprocessors.
		CO5	Summarize parallel architecture and the software used for them.
17CS73	MACHINE LEARNING	CO1	Choose the learning techniques and investigate concept learning.
		CO2	Identify the characteristics of decision tree and solve problems associated with that.
		CO3	Apply effectively neural networks for appropriate applications.



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		CO4	Apply Bayesian techniques and derive effectively learning rules.
		CO5	Evaluate hypothesis and investigate instant based learning and reinforced learning
17CS742	CLOUD COMPUTING AND ITS APPLICATIONS	CO1	Understand the concepts of cloud computing, virtualization and classify services of cloud computing .
		CO2	Illustrate architecture and programming in cloud.
		CO3	Define the platforms for development of cloud applications and list the application of cloud.
		CO4	Describe the fundamental concepts of cloud storage and demonstrate their use in storage systems .
		CO5	Analyze various cloud programming models and apply them to solve problems on the cloud.
17CS754	STORAGE AREA NETWORKS	CO1	Discuss the fundamentals of storage centric and server centric systems.
		CO2	Analyze the Technologies used for Designing storage area networks
		CO3	Explain the Backup, Archive and Replication
		CO4	Explain Cloud Computing and virtualization concepts.
		CO5	Apply the techniques used for Securing and Managing Storage Infrastructure
17CSL76	MACHINE LEARNING LABORATORY	CO1	Understand the implementation procedures for the machine learning algorithms.
		CO2	Design Java programs for various Learning algorithms.
		CO3	Apply appropriate data sets to the Machine Learning algorithms.
		CO4	Identify Machine Learning algorithms to solve real world problems.
		CO5	Apply Machine Learning algorithms to solve real world problems.
17CSL77	WEB TECHNOLOGY LABORATORY WITH MINI PROJECT	CO1	Students can able to design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.
		CO2	Students can understand the good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services.
		CO3	Students can understand the Integrated Development Tool, Frontpage2000/Dream Weaver.



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		CO4	Students can able to work in the area of Online Game programming.
		CO5	Students can able to design web pages through coding using HTML and DHTML.
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 the 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.
17CS82	BIG DATA ANALYTICS	CO1	Understand HDFS and examine MapReduce programming.
		CO2	Understand Hadoop related tools and manage Hadoop with Ambari.
		CO3	Understand business intelligence concepts, data warehousing, data mining and visualization.
		CO4	Apply core data mining techniques for data analytics.
		CO5	Apply various text mining and web mining techniques.
17CS834	SYSTEM MODELLING AND SIMULATION	CO1	Define and explain the basic concepts in modeling and simulation.
		CO2	Able to apply statistical models to find system behavior.
		CO3	Apply appropriate methods for the generation of random numbers and test them for ideal statistical properties.
		CO4	Understand process of input modeling.
		CO5	Understand the process of verification and validation models
17CS84	INTERNSHIP / PROFESSIONAL PRACTISE	CO1	Adapt easily to the industry environment
		CO2	Take part in team work
		CO3	Make use of modern tools
		CO4	Decide upon project planning and financing.
		CO5	Adapt ethical values.



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17CSP85	PROJECT WORK PHASE II	CO1	Survey the changes in the technologies relevant to the topic selected.
		CO2	Discuss the technology and interpret the impact on the society.
		CO3	Discuss the technology and interpret the impact on the environment.
		CO4	Discuss the technology and interpret the impact on the domain.
		CO5	Compile report of the study and present to the audience, following the ethics.