SAHYADRI
COLLEGE OF ENGINEERING & MANAGEMENT
MANGALURU

Department of Computer Science and Engineering

AY 2018-19

Course code	Subject code	Subject Name	Course Outcome
C201	17MAT31	Engineering Mathematics - III	Understand and use Fourier series to expand periodic functions.
			Apply Fourier transforms and work out the basic problems on Z-transforms .
			Understand the concepts of curve fitting, statistical methods and solving algebraic and transcendental equations numerically.
			Apply the concept of forward, backward and divided differences on simple problems and the techniques of numerical integration.

			Find the surface and volume integrals .Apply Green's theorem, Divergence Theorem and Stokes theorem in various applications
C202	17CS32	Analog & Digital Electronics	Understand the construction and characteristics of the semiconductor devices JFETS and MOSFETS, their differences with BJTS, to learn the operational amplifiers and their various applications.
			Discuss simplification of Boolean functions by using various techniques and implementation of simplified function by using suitable logic gates.
			Realize the combinational logic circuits by using various logical blocks.
			Design counters and develop sequential circuit applications using flip flop and registers
			Develop and understanding the concept ADC and DAC blocks required for data conversion.

C203	17CS33	Data Structures and Applications	Understand the various types of data structures, operations and algorithms.
			Understand and apply the various algorithms related to data structure.
			Illustrate the concepts of data structures like stack , queue ,list, Trees and Graphs
			Apply the concepts of data structures in problem solving
			Develop the data structures using high level language.
C204	17CS34	COMPUTER ORGANIZATION	Explain how basic functional units are interconnected to form a complete computer system and also about the role of system software.
			Distinguish the various mechanisms used for, input-output data transfer and standard input-output interfaces.
			Illustrate memory hierarchy, and various memory management techniques used for improving the performance of the computer

			Solve computer arithmetic and logical operations with integer and floating-point operands.
			Understand basic processing unit and organization of simple processor, concept of pipelining and other large computing systems.
C205	17CS35	UNIX AND SHELL PROGRAMMING	Illustrate the UNIX system Architecture and its basic Commands.
			Make use of all file related commands to perform UNIX file operations.
			Demonstrate Vi editor and regular expression commands.
			Develop various shell programs for simple applications.
			Illustrate UNIX System calls, Process handling and basics of Perl script.

C206	17CS36	Discrete Mathematical Structures	Utilize mathematical logic to verify the validity of an argument and also construct proofs using direct proof, indirect proof and proof by contradiction.
			Construct proofs using Mathematical Induction, recursive method and use principles of counting to solve problems
			Illustrate the concepts of relations and functions and also outline the properties of relations
			Solve problems involving recurrence relations and principle of inclusion exclusion
			Construct graphs and trees to solve various problems
C207	17CSL37	Analog and Digital Electronics Laboratory	Demonstrate the ethics and self-managing skills during laboratory sessions
			Design and demonstrate analog electronic circuits for given input values and for different conditions

			Explain in verbal the principles, concepts and application of each experiment through viva voce
			Design and demonstrate various combinational and sequential logic circuits for hardware digital circuits.
			Make use of simulation package to design analog and digital electronics circuits.
C208	17CSL38	Data Structure Laboratory	Develop C programs to demonstrate the concepts of array and string operations
			Implement the concepts of stack and queue to demonstrate their operations by using C programming language.
			Develop C programs to demonstrate the concepts of linked list
			Design, develop and demonstrate the concept of non-linear data structures –Trees and Graphs.
			Develop C program to demonstrate the concepts of hashing.

C209	17KL49	Kannada	Students are able to use essence of kannada grammar for their local conversations interacting with respective state holders
			Able to understand different movements in the form of poetry of various revolutionary writers; and their intention to serve society
			Able to use regional language to communicate science and its applications in day to day life
			Students are able to self-transformed by studying eminent engineer's biography and to upkeep cultural heritage
			Students are able to understand social issues and societal needs to up keep humanitarian and ethical values of the society
C210	17MAT41	Engineering Mathematics - IV	Use appropriate single step and multi-step numerical methods to solve first order ordinary differential equations

			Evaluating second order differential equations and understanding the basics of Bessel's function and Legendre's polynomials.
			Applying the concepts of analytical functions, residues and poles and working out problems on complex valued functions and complex integration
			Work out problems on random variables and probability distributions using statistical methods.
			Evaluate the problems in joint probability distributions, Sampling techniques and Markov chains
			Understand the features of C++ and the associated merits as an object oriented programming language
C211	17CS42	Object Oriented Concepts	Identify classes, objects, Data types, variables, arrays, Operators Control Statements needed for a specific problem

			Make use of inheritance, interface, packages, exceptions to develop the solutions and learning the different techniques to handle the exceptions.
			Analyze the various the multi-threading concepts with related programs and understanding the different event handling mechanisms
			Develop different applet class programs in order to create graphic windows and build various swing applications
C212	17CS43	Design and Analysis of Algorithm	Understand and Explain the concepts used in Algorithm design and analysis.
			Identify and analyze various algorithm design techniques
			Estimate the computational complexity of different algorithms.
			Develop an algorithm using appropriate design technique for problem solving.
			Develop algorithms for solving real world problems

C213	17CS44	Microprocessors and Microcontrollers	Explain architecture, addressing modes and assembly language programming of the 8086 microprocessors
			Explain the instruction set for unsigned numbers and also the interrupt routines of 8086
			Explain the instruction set for signed numbers and also to develop memory interfacing and input /output interfacing for 8086.
			Compare microprocessors and microcontrollers and also to explain the ARM Embedded systems
			Discuss the instruction set and architecture of ARM embedded systems .
C214	17CS45	Software engineering	Explain common lifecycle processes and ethical responsibilities in the development of a software system using waterfall (linear), incremental approaches (such as Unified process) and agile approaches

			Build the context, structure and behavioral models of a software system using the UML diagrams
			Apply various software testing and quality assurance techniques at the module level , system level and organization level
			Model quality software product by working as an individual and as part of a multidisciplinary team
			Illustrate the usage of agile methodologies and tools necessary for quality software construction
C215	17CS46	Data Communication	Explain the data communication system, the different network topologies, the protocol layering and its functions.
			Apply the digital and analog transmission techniques to solve problems.
			Explain the switching criteria and error detection and control protocols
			Analyze the wired and wireless LANs using Media Access Control.

			Compare the various Wireless networks and their protocols.
C216	17CSL47	Design and Analysis of Algorithms	Design and implement the basic concepts like threads, inheritance and exception handling of java programming language
			Design , Analyze and implements the divide and conquer algorithms using java programming language and compare its time complexity for different cases.
			Design and implements the greedy algorithms using java programming language
			Design and implements the algorithms based on dynamic programming concepts using java programming language
			Design and implements the backtracking algorithms by using java programming language.
C217	17CSL48	Microprocessor and microcontroller laboratory	Develop and execute the programs using 8086 Assembly Language with

			the help of any suitable assembler like MASM/TASM/8086 kit or any equivalent software.
			Make use of KEIL software to simulate assembly language programs and c language programs for ARM microprocessor.
			Make use of different I/O interfacing with 8086 microprocessor.
			Construct different waveforms using 8086 microprocessor.
			Make use of different I/O interfacing using ARM processor.
C301	15CS51	Management & Entrepreneurship for IT Industry	Explain and illustrate the Management, Planning, Organizing and Staffing and outline their importance in entrepreneurship
			Identify the traits of leadership. Demonstrate the importance of Coordination, Communication, Directing and Controlling.
			Define the basics of Entrepreneurship and how to deal with the problems while setting up a business.

			Distinguish the various types of reports, their generation and how to design a project report for enterprises.
			Analyze the case studies of various Small Scale Industries, the institutional support provided to them and their rights.
C302	15CS52	Computer Networks	Demonstrate the principle of application layer protocols.
			Summarize transport layer services and infer UDP and TCP protocols
			Compare routers, IP and Routing Algorithms in network layer
			Identify the Wireless and Mobile Networks covering IEEE 802.11 standard
			Analyze multimedia Networking and Network Management
C303	15CS53	Database Management System	Explain the basic concepts of data base system

			Construct appropriate databases by applying the various concepts of Relational Model.
			Explain and apply Structure Query Language (SQL) to solve various database operations.
			Analyze and develop standard databases for various real world problems
			Utilize the concepts of transaction processing in Database System.
C304	15CS54	AUTOMATA THEORY AND COMPUTABLITY	Explain the fundamental theories, concepts and techniques in automata and their computation..
			Apply the techniques to translate between different models of computations
			Build grammars, regular expression and automata for different language classes and understand their relative powers
			Analyze a problem with respect to different models of computations

			Apply skills to formulate formal model from a specific real world problem
C305	15CS551	Object Oriented Modelling and Design	Illustrate the concepts involved in Object-Oriented modeling and their benefits.
			Demonstrate concept of use-case model, sequence model and state chart model for a given problem.
			Explain the facets of the unified process approach and framework for a software system.
			Translate to the design models with their respective input models.
			Choose an appropriate design pattern to facilitate development procedure.
C306	15CS552	INTRODUCTION TO SOFTWARE TESTING	Describe the various aspects of Software testing

			Apply software testing techniques to derive the test cases for any given problem and compare different Functional testing techniques.
			Differentiate various Structural testing techniques and choose best out of them.
			Apply Verification and validation techniques to test the software, assess the adequacy of test suites using program mutation
			Describe various Integration and Component based testing strategies.
C308	15CS554	Advanced Algorithm	Explain the principles of algorithmic design, analysis and comparison for efficiency.
			Apply the algorithms effectively and intelligibly to solve problems in various domains.
			Explain the number theoretic principles with their usage to solve related problems.

			Develop skills to optimize routing and network related problems using graph algorithms.
			Describe the fundamental knowledge of computational geometry.
			Understand fundamental theories, concepts and techniques of AI
			Develop skills to formulate AI based model for a specific real world problem
C310	15CS562	Artificial Intelligence	Define and Explain various learning techniques
			Develop skills to build an Expert system
C312	15CS564	Dot Net Framework for Application Development	Explain the syntax and semantics of c# language and the concepts of managing errors and exceptions.

			Develop an object oriented concepts, enumeration, structures and arrays in c# programming language.
			Demonstrate the concept of creating interfaces ,garbage collection and resource management in c #.
			Illustrate the use of properties , indexers, generics and collections in c#.
			Build queries to query in-memory data and identify operator behavior using operator overloading.
C314	15CSL57	Computer Networks Laboratory	Design program for simulating the packet transfer in wired networks with duplex link
			Design and implement Ethernet LAN /simple ESS using Wireless networks.
			Implement CDMA/GSM on NS2/NS3 to study and analyses their performances.
			Apply java/c programming skills to verify and solve network related issues.

			Infer the connection oriented and connectionless protocols to implement socket programming.
C315	15CSL58	DBMS LAB	Create data base and write significant queries to retrieve data and also demonstrate the concept of partitioning the table.
			Create data base and write significant queries to retrieve data and also demonstrate the use of UNION operation.
			Create data base and write significant queries to retrieve data and also demonstrate the use of JOIN operation.
			Create data base and write significant queries to retrieve data and also demonstrate how triggers can be created and applied.
			Create data base and write significant queries to retrieve data and also demonstrate the use Correlated nested queries.

			Design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing and implementing a database mini project.
C316	15CS61	CRYPTOGRAPHY, NETWORK SECURITY AND CYBER LAW	Explain the concepts of cryptography and its need to various applications
			Analyze various cryptography algorithms and its usage
			Illustrate key management issues and its solutions
			Summarize wireless LAN security methods
			Apply cyber law with respect to security
C317	15CS62	Computer Graphics and Visualization	Describe the various aspects of computer graphics and OpenGL.
			Apply algorithms to implement 2D graphics primitives and attributes.
			Illustrate geometric transformations on 2D and 3D objects.

			Apply the concepts of clipping, hidden surface removal, lighting and viewing on 2D and 3D objects.
			Develop interactive graphics applications using various input devices.
C318	15CS63	System Software & Compiler Design	Understand the concepts of System Software and make use of it to generate machine codes.
			Understand and apply different concepts associated with loader and linker.
			Explain the functionality of each phase involved in compilation process and construct the grammar for the given regular expression.
			Analyze the parsing techniques for the given programming construct described in Context free grammar.
			Construct Syntax directed tree and Develop machine level codes.
C319	15CS64	Operating System	Explain and illustrate the various operating system concepts , system

			structure and Computing environments.
			Analyze different multithreading models, summarize the techniques of process synchronization and develop a scheduling solution using proper algorithm
			Examine the different deadlock scenarios to Provide the solutions and choose the appropriate memory management strategy
			Make use of virtual memory management model for page replacement and outline the implementation of file system
			Demonstrate different Secondary Storage structures. protection mechanism- disk allocation mechanism and Case Study of Linux system
C322	15CS654	Operation Research	Explain the concepts and importance of Operation Research and build Linear Programming model for the real world problems.

			Solve the Linear Programming Problems using appropriate optimization techniques.
			Examine the importance of dual, its relationship with primal and solve the primal using duality concepts.
			Develop mathematical skills to solve specialized Linear Programming Problems like transportation and assignment problems.
			Analyze the decision making problems using game theory and metaheuristics techniques.
C327	15CS664	Python Application Programming	Illustrate the syntax and semantics of the Python including types, operators, Function, Loops and Conditional statements.
			Demonstrate expertise in usage of Strings and File Systems.
			Create, build and test Python Programs using core data structures

			like Lists, Dictionaries and use Regular Expressions.
			Apply the concepts of Object-Oriented Programming in Python.
			Develop typical python applications associated with Network Programming, Web Services and Databases.
C330	15CSL67	System Software and Operating System Lab	Make use of Lex and YACC tools to obtain solutions for various problems.
			Develop compiler design methods using C/Java programs.
			Experiment with various scheduling algorithms to check efficiency.
			Utilize suitable algorithms to avoid dead lock problem.
			Examine the efficiency of page replacement algorithms.
C332	15CSL68	Computer Graphics Laboratory with mini project	Demonstrate Computer Graphics algorithms using OpenGL.

			Illustrate various transformation and rotation concepts.
			Demonstrate geometric transformations and viewing on 3D objects.
			Demonstrate representation of curves, surfaces, colors and illumination models.
			Demonstrate and document the concepts used in Computer Graphics using a Mini Project.
C401	15CS71	Web Technology and Its Applications	Illustrate the syntax and semantic structures of HTML and CSS to build web pages
			Construct and visually format tables and forms using HTML and CSS
			Create a well-structured client side scripting and server side scripting to generate and display the contents dynamically
			Apply object oriented programming concepts and exceptional handling using PHP
			Inspect JavaScript frameworks create dynamic ,interactive websites

C402	15CS72	Advanced Computer Architecture	Explanation of parallelism in computer architecture, models of parallel computer systems, new trends and developments in computer architecture.
			Illustrate the hardware technologies-memory hierarchy and virtual memory technology.
			Explanation of the overall organization of cache, pipeline processors and super scale techniques.
			Demonstrate the generation of various parallel and scalable architectures and their principles.
			Illustrate the parallel programming concepts.
C403	15CS73	Machine Learning	Classify the learning techniques with this basic knowledge
			Identify the characteristics of decision tree and solve respective problems

			Apply effectively neural networks for appropriate applications
			Apply Bayesian techniques and derive effectively learning rules
			Choose and differentiate reinforcement and analytical learning techniques
C406	15CS743	INFORMATION NETWORK SECRUITY	Demonstrate the cryptographic techniques
			Analyze various Hash Functions and its uses in Cryptography
			Analyze entity authentication fundamentals and key establishment protocol.
			Discuss the need of key management
			Identify Cryptographic Applications
C407	15CS744	Unix System Programming	Understanding the basics of UNIX and POSIX Development environment, API Characteristics

			Classifying The UNIX and POSIX file systems and applying UNIX File APIs to different problems
			Analyzing the processes and Distinguishing between different process control mechanisms
			Identifying various signals daemon Processes and Explaining Inter process Communication
			Design and build an application/service over the Unix operating system
C411	15CS754	SAN	Identify key challenges in managing information and discuss the various Raid implementation
			Interpret the different storage networking technologies and virtualization
			Describe the CAS architectures and types of Archives
			Describe cloud computing characteristics

			Illustrate the Storage Infrastructure and Management activities
C412	15CSL76	Machine learning laboratory	Apply FIND-S algorithm and Candidate Elimination algorithm for the hypothesis provided.
			By developing an ID3 Algorithm, build a decision tree
			By applying the Backpropagation build an ANN, train and test by using respective datasets
			By applying the concepts of probability, build classifiers based on Bayesian Theorem
			Apply ML algorithms for clustering and predicting the data
C413	15CSL77	Web Technology Laboratory with Mini project	Develop web pages using HTML , JavaScript and Cascading Style Sheets.

			Develop Web pages by using HTML5 and JavaScript.
			Develop XML documents by using Cascading Style Sheets.
			Develop PHP programs to create web based application and establish connectivity between the webpages and database.
			Develop web based application.
C414	15CSP78	Project Phase 1 + Seminar	Conduct literature survey on domain interest
			Develop the problem statement and objectives
			Design engineering solutions for the problem statement.
			Develop hardware or the software solution for the defined problem
			Document the various phases of the project
C415	15CS81	Internet of Things Technology	Explain the impact and challenges posed by IoT networks leading to new architectural models.

			Illustrate the deployment of smart objects and the technologies to connect them to network.
			Apply the IoT protocols for efficient network communication.
			Summarize the need for Data Analytics and Security in IoT.
			Analyze the different sensor technologies for sensing real world problems using case studies.
C416	15CS82	Big data Analytics	Understand and implement efficient big data solutions for various application areas using HDFS & Map Reduce framework.
			Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop administration .
			Recognize the role of Business intelligence, Data ware housing and Visualization in Decision making .
			Interpret the Big Data Fundamentals, including the operations of Big Data, the characteristics of Big Data and the various methods like Regression, ANN, cluster analysis, etc.

			Apply the novel architectures and platforms introduced for various data analytics techniques, in particular Text mining, Web mining , Social Network Analysis, etc.
C420	15cs834	System Modeling and simulation	Illustrate the importance of system simulation and make use of different techniques to simulate various systems.
			Analyze the real world phenomena by using appropriate statistical models and perform the analysis of queing models through simulation.
			Analyze and examine the properties of random numbers and generate random variate using different techniques.
			Examine the use of input models in simulation by choosing the statistical distributions and perform the output analysis of simulation.
			Interpret the output performance of simulation data and discuss the verification and validation process of the simulation model.

C421	15CS84	Internship and Professional Practice	Relate the Hypothesis and basic knowledge acquired and apply them to the real-world scenario.
			Realize and report the structural flow of the organization and critical issue management process.
			Realize and practice the modern tools and techniques to solve complex engineering problems at appropriate level
			Demonstrate Professional values by satisfying requirements and code of conduct of Industrial practices
			Interact effectively with industrial stakeholders to acquire the experience and enable life-long learning
			Monitor the workflow day to day activities and document the findings in a presentable format
			Present effectively the knowledge and experience gained during Internship.
C422		Project work phase II	Conduct literature survey on domain interest

			Develop the problem statement and objectives
			Design engineering solutions for the problem statement.
			Develop hardware or the software solution for the defined problem
			Document the various phases of the project
			Present and demonstrate the outcomes of the defined problem
			Apply engineering and management principles to achieve the goal
C423	15CSS86	Seminar	Identify the research papers/applied knowledge resources on latest trends in area of interest and formulate objectives of the study.
			Acquaint literatures review methods and identify the significant technical information relevant to selected topic.
			Interpret the observations with hypothesis and summarize the conclusions.
			Adopting logical though process and sift the findings efficiently to

			produce well-structured and tailored report.
			Prepare and present the outcomes of the observations and suggestions to improve the future scope.