Bachelor of Technology - Computer Science and Engineering

2017-2021 Batch

ProgramOutcomes (POs)

- **PO 1:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems.
- **PO 2:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences..
- **PO 3:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations
- **PO4:** Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions..
- **PO 5:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling to complex engineering activities, with an understanding of the limitations.
- **PO6:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO 7:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **PO 8:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO 9:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO 10:** Communicate effectively on complex engineering activities with the engineering community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO11:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO 12:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

ProgramSpecificOutcomes(PSO)

- ✓ **PSO 1:** Design and develop network, web-based, cloud-based computational systems
- ✓ **PSO 2:** Design efficient algorithms, understand software practices and implement code with optimization

Course Outcomes (COs)

Batch: 2017-2021

Semester	Course Code	CourseName	CourseOutcomes(COs)
I	17BS1MA01	Applied Engineering Mathematics-I	**CO1:**Determine the power series expansion of the function with the help of mean value theorems **CO2:**Analyze the multivariable function for extreme values **CO3:**Apply multiple integrals to find area, surface area and volume **CO4:**Employ the method of reduction formulae to find surface area and volumes of evolution **CO5:**Solve first and higher order ordinary differential equations. **CO6**:Model a physical phenomenon into a mathematical equation
	17BSCPY02	Applied Physics	**CO1:**Understand the role of physics in Engineering field **CO2:**Analyze the applications of physics for engineering problems **CO3:**Demonstrate the problem-solving ability to identify the solutions **CO4:**Construct the quantum model to explain the behavior of a system at microscopic level **CO5:**Apply the properties of lasers to improve the optical fiber communication

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17BSCPY02L	Physics Lab	**CO1:**Demonstrate the working knowledge of optical, electrical and electronics experiments **CO2:**Illustrate the procedure to conduct the experiments and correlate their results **CO3:**Compare moduli of elasticity of given materials **CO4:**Interpret the diffraction of light to determine the wavelength of incident laser **CO5:**Examine the Fermi energy of a conductor and semiconductor **CO6:**Construct simple circuits to verify I-V characteristics of a diode, Stefan's constant, Planck's constant, Dielectric constant and frequency response of resonance circuit
	17ESCCV03	Basics of Civil Engineering	**CO1**:. Knowledge of different fields of Civil Engineering, Building Materials and Planning of a Building **CO2**: Comprehend Resultant of Concurrent and Non-Concurrent Force Systems, Support Reactions, Concept of Centroid and Moment of Inertia **CO3**. Compute Resultant Forces, Centroid of Plane Figures, Moment of Inertia
	17ESCME04	Basics of Mechanical Engineering	**CO1:**Describe working of steam turgines, impulse and reaction turbines **CO2:**Demonstrate knowledge on machine tools and basic manufacturing processes. **CO3:**Explain working of two stroke and Four stroke IC engine **CO4:**Discuss on the basics of refridgeration and airconditioning systems. **CO5:**Discuss on the orking Principles of power transmitting elements.and related actuators **CO6:**Demonstrate knowledge on basics of manufacturing processes and machine tools
	17ESCME05	Engineering Graphics	**CO1:**Indicate the basic entities and perspective of a technical drawing as per the BIS standards **CO2:**Construct the projection of points in various angles of projections manually and with SolidEdge. **CO3:**Construct the projection of lines and planes in first angle projection manually and with SolidEdge **CO4:**Construct the projection of solids in first angle projection manually and with SolidEdge **CO5:**Construct the projection of solids in isometric perspective manually and with SolidEdge **CO6:**Generate orthographic and isometric views through CAD software

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17ESCME41L	Worskshop Practice	**CO1**: Demonstrate knowledge on the basics of casting, forming, machining, Joining processes **CO2**: Discuss on the concepts and programming related to CNC machines **CO3**: Demonstrate skill on fitting with square joint and V joint **CO4**:Demonstrate skill on carpentry works with dove tail joint and lap joint **CO5:**Demonstrate skill on carpentry works with dove butt joint. lap joint and T joint **CO6:**Perform casting of simple components .
	17HSSC06	Sociology and Elements of Indian History for Engineers	**CO1:**Understand the fundamental concepts of Sociology and History **CO2:**Apply the sociological concepts with new technologies for overall growth **CO3:**Analyze the theoretical concepts and to reflect on them in contemporary social life **CO4:**Evaluate the knowledge of social change into developments of the society
	17BS2MA01	Applied Engineering Mathematics-II	**CO1**:Apply double and triple integrals to find surface area and volume of solids **CO2:**Employ differentiation on vector point functions **CO3**:Analyze line, surface and volume integrals using vector point functions **CO4**:Apply Laplace Transforms to solve ordinary differential equations **CO5**:Analyze the solution of system of linear differential equations using Eigen value and Eigen vectors **CO6:**Test for consistency and solve system of linear equations

Semester	Course Code	CourseName	CourseOutcomes(COs)
II	17BSCCH02	Applied Chemistry	**CO1:**Have knowledge of basics of Nanomaterials and their application **CO2:**Understand the concepts of Fuels, corrosion and their importance in the engineering **CO3:**Ability to understand different types of pollutions and analysis of pollutants **CO5:**Interpret the replacement of conventional materials by polymers for domestic and industrial applications **CO6:**Have a knowledge of electrochemistry and Ability to analyze & design of energy storage devices
	17BSCCH02L	Chemistry Lab	**CO1:**Analyse the physical principle involved in the various instruments **CO2:**Relate the principles of the experiments to new application **CO3:**Perform different types of titrations in volumetric analysis **CO4:**Exhibit skills in performing experiments based on theoretical fundamentals **CO5:**Study and apply basic chemistry laboratory techniques for small/large scale water analysis and purification **CO6:**Improve cognitive skills in accordance with current engineering and technology developments
	17ESCEE04	Basics of Electrical Engineeing	**CO1:**understand the basic laws used in electrical circuits, both DC & AC, Electrical Power Generation. **CO2:**analyze the working of electrical machines. **CO3:**distinguish between conventional and non conventional sources and their applications.

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17ESCEE34L	Electrical and Electronics Lab	**CO1:**Analysis of Resistive Circuits and Solution of resistive circuits with independent sources **CO2:**Analysis of Single Phase AC Circuits, the representation of alternating quantities and determining the power in these circuits **CO3:**Analysis of DC Circuits and practical demonstration of Kirchoff's laws
	17ESCCS05	Problem Solving thorugh Programming	**CO1:**Understand the components of computing systems and programming concepts **CO2:**Develop algorithms and flowchart for mathematical and scientific problems **CO3:**Exhibits the knowledge of programming basics with C program structure **CO4:**Develop modular programs using decision and control structures **CO5:**Demonstrate the usage of Pointers, arrays, strings and functions **CO6:**Implement programs to solve real world problems using programming feature
	17ESCEC03	Basics of Electronics Engineering	**CO1:**Explain the fundamentals and concepts of semiconductor devices and its application's **CO2**:Demonstrate knowledge on the basic structure and operation of transistor with different configurations for various applications **CO3:**Explain the basics of Communication System with transmission medium and modulation schemes CO4:Examine different analog & digital circuits

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17ESCCS05L	Problem Solving throgh Programming Lab	**CO1:**Formulate the algorithms for mathematical & computational problems **CO2:**Translate given algorithms to a working and correct program **CO3:**Demonstrate programming development tool, compiling, debugging, linking and executing a program **CO4:**Exhibit programming knowledge by using appropriate construct to solve a given problem **CO5:**Design to logical formulations to solve mathematical & computational **CO6:**Develop effectively the required programming components that efficiently solve computing problems in real world
	17HSS07	Communicative English	**CO1:**Explore new ideas in areas like presentations, group discussions and conversations **CO2:**Transform their pronunciation of English with basic understanding of phonetics **CO3:**Express fluently in flawless English with proper understanding of grammar and syntax **CO4:**Develop command in their language which would build their confidence **CO5:**Identify the salient features of literary texts to produce creative thinking and imaginative writing
	17BS3CS01	Discrete Mathematics and Graph Theory	**CO1:**Familiar with Mathematical structures and operations **CO2:**Learn the principles used in the analysis of Algorithms. **CO3:**Develop Boolean Algebraic Expressions **CO4:**learn the construction of databases of logical flows **CO5:**Study finite state machine **CO6:**Aquire ability to describe computer programs in a formal mathematical manner
	17HSSC08	Economics for Engineers	**CO1:**Identify and explain economic concepts and theories related to the behavior of economic agents, markets, industry and firm structures, legal institutions, social norms, and government policies **CO2:**Demonstrate an awareness of the role in the global economical environment. **CO3:**Integrate theoretical knowledge with quantitative and qualitative evidence to formulate predictions on future development. **CO4:**Evaluate the consequences of economic activities and institutions for individual and social welfare. **CO5:**Apply the basic theories of economics in critical thinking and problem solving.

Semester	Course Code	CourseName	CourseOutcomes(COs)
III	17CCC31	Data Structures and Algorithms	**CO:1** Understand the algorithms and data structures in terms of time complexity of basic operations. **CO:2:**Describe linear, non-linear data structures and usage of the various concepts of data structure, algorithms and ADT. **CO3**:Efficiently implement data and control structures. These structures will include arrays, lists, stacks, queues, trees, graphs, searching, sorting and hash tables. **CO4:**Quantitatively evaluate alternative implementations and explain the trade-offs involved. **CO5:**Apply and implement the appropriate algorithm to solve a given problem **CO6:**Demonstrate various methods of organizing large amounts of data
	17CCC32	Computer Organization and Architecture	**CO1:**Understand basic structure of computer and demonstrate the execution of an instruction by CPU. Also, to identify different addressing modes for a given instruction. **CO2:**Perform computer arithmetic operations and implement algorithms for fixed point and floating point arithmetic operations. **CO3:**Illustrate and manipulate the control unit operations and to choose different factors to design central processing unit **CO4:**Conceptualize different ways of data transfer in computer and to contrast the working of different memories by studying memory hierarchy and organization. **CO5:**Analyze different types of computer instructions and different stages of instruction cycle inside CPU **CO6:**Design Simple processor using simulation tool
	17CS33	Digital and Logic Design	**CO1:**Understand and apply the fundamental concepts used in digital electronics. **CO2:**Relate and analyze range of techniques used for simplification of digital circuits **CO3:**Design different combinational circuits in digital electronics **CO4:**Design various sequential circuits in digital electronics **CO5:**Identify the requirements of the application, design and troubleshoot a cost effective digital system

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17MCC03	Energy Studies	**CO1:**Students will have knowledge of energy scenario and its importance to the society **CO2:**Students can understand and suggest few energy management and energy conservation techniques in daily life. **CO3:**Students will be aware of energy policies **CO4:**Students can get the emerging technologies importance in today's energy scenario.
	17CCC31L	Data Structures and Algorithms Laboratory	**CO1:**Implement / Design suitable data structures as required in C programs **CO2:**Construct the programs for implementing stacks, queues and their applicatio **CO3:**Develop the programs to implement various operations of linked lists and their application **CO4:**make use of tree concepts to implement programs for their applications **CO5:**apply Algorithm for solving problems like sorting, searching, insertion and deletion of data to a programs by choosing appropriate data structures to solve a problem **CO6:**identify and use a suitable data structure and algorithm to solve a real world problem
	17CS33L	Digital and Logic Design Laboratory	**CO1:**Apply fundamentals of digital logic to simplify digital circuits **CO2:**Identify, understand various digital ICs and implement them in digital design. **CO3:**Analyze, design and implement combinational circuits. **CO4:**Analyze, design and implement sequential circuits. **CO5:**Design and troubleshoot a cost effective digital circuit.
VI	17BS4MA01	Linear Algebra	**CO1:**Solve systems of linear equations using multiple methods, including Gaussian elimination and matrix inversion. **CO2:**Demonstrate understanding of the concepts of vector space and subspace. **CO3:**Apply principles of matrix algebra to linear transformations. **CO4:**Use mathematical concepts in problem-solving through integration of modeling. .

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17CIC41	Programming in JAVA	**CO1:**Define and understand Object Oriented programming concepts using basic syntaxes of control Structures, strings and function for developing skills of logic building activity. **CO2:**Identify classes, objects, members of a class and the relationships among them needed for finding the solution to specific problem. **CO3:**Apply the concepts to achieve re usability using inheritance **CO4:**Implement Multiple inheritance and to create packages **CO5:**Demonstrate exception handling mechanisms with real world examples. **CO6:**Design and Develop applications using JDBC connectivity
	17CS44	Microcontroller and Embedded systems	**CO1:**Understand the architecture of 8051 microcontroller. **CO2:**Simulate, Analyse and develop programs using assembly language. **CO3:**Develop simple applications on microprocessor and microcontroller -based systems. **CO4:**Acquire knowledge about characteristics, design process and challenges encountered in the design of embedded systems **CO5:**Design embedded computing platform using component, memory and I/O device interfacing.
	17CIC43	Operating Systems	**CO1:**Discuss different types of modern operating systems, their structures and basic functions. **CO2:**Explain the basic concepts of process scheduling, critical section problem, deadlocks and memory management strategies. **CO3:**Apply different CPU Scheduling algorithms and process synchronization techniques. **CO4:**Apply different memory management strategies and deadlock handling mechanisms. **CO5:**Demonstrate different disk scheduling algorithms and file management strategies. **CO6:**Illustrate high-level structure of the Linux kernel.

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17HSS04	Business Communication and Presentation skills	**CO1:**Overcome common obstacles in public speaking. **CO2:**Demonstrate critical and innovative thinking. **CO3:**Display complete in oral, written and visualization. **CO4:**Understand the importance of research in developing your topic. **CO5:**Use resources to gather information effectively.
	17CIC42	Automata Theory and Logic	**CO1:**Understand Power and Limitations of theoretical models of Computation. **CO2:**Compare different types of languages and machines. **CO3:**Match constraints of a language to power of machines. **CO4:**Provide theoretical preparation of the study of programming languages and compilers. **CO5:**Design and analyze Turing machines. **CO6:**Apply the concepts to theory of computation to design various models in computer science.
	17CIC41L	Programming in JAVA Laboratory	**CO1:**Define and understand Object Oriented programming concepts using basic syntaxes of control Structures, strings and function for developing skills of logic building activity. **CO2:**Identify classes, objects, members of a class and the relationships among them needed for finding the solution to specific problem. **CO3:**Demonstrate how to achieve reusability using inheritance, interfaces **CO4:**Develop a jdbc application to interact with database **CO5:**Design and implement algorithms for sorting and tree traversals **CO6:**Design and implement algorithms finding minimum spanning tree.

	17CS44L	Microcontroller Laboratory	**CO1:**Understand the basics of embedded C programming using 8051. **CO2:**Demonstrate the working skills with IDE (Keil µVision). **CO3:**Design circuits for various applications using microcontrollers. **CO4:**Apply the concepts on real- time applications. **CO5:**Demonstrate the skill for Designing LCD, stepper motor by Interfacing circuits. **CO6:**Design different waveform using DAC interface.

Semester	Course Code	CourseName	CourseOutcomes(COs)
V	17CIC51	Probability, Statistics and Random Processes	**CO1:**Ability to solve various problems regarding probability and conditional probability. **CO2:**Examine, analyze and compare probability distributions. **CO3:**Prepare null and alternative hypothesis and test its validity based on random sample. **CO4:**Ability to solve various types of regression problems. **CO5**:Ability to understand various queuing models.
	17CIC52	Data Communication and Computer Networks	**CO1:**Understand OSI and TCP/IP models **CO2:**Analyze the analog to Digital conversions and vice versa, Multiplexing and various types of transmission media used in data communication **CO3:**Analyze different types of switching networks and MAC layer protocols. **CO4:**Apply various error detection and correction techniques employed in data link layer **CO5:**Demonstrate the ability to explain networking as it relates to the connection of computers, media, and devices (routing) **CO6:**Design and simulate various topologies using layer 2 and layer 3 devices.
	17CIC53	Database Systems	**CO1:**Understand the different issues in the design and implementation of a Database system and to study the physical and logical database designs **CO2:**present the modeling concepts of a high-level conceptual data model, the Entity-Relationship (ER) model, Relational Model and Algebra **CO3:**apply the data manipulation language commands to query, update and manage a database. **CO4:**examine SQL commands for retrieving multiple tuples using Iterators, using CURSORs, Triggers. **CO5:**analyze the different normalization techniques by understanding the essential DBMS concepts **CO6:**Demonstrate the ACID properties of Transaction management

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17CS54	Software Engineering and Testing	**CO1:**Understand the basic concept of object oriented software engineering and Comprehend software development life cycle **CO2:**Analyze and specify software requirements **CO3:**Exhibit the knowledge in software project from requirement gathering to implementation **CO4:**Focus on the fundamentals of modeling a software project using UML **CO5:**Apply software design, development and testing techniques **CO6:**Analyze and Apply project management techniques for a case study.
	17CIC55	Parallel Computing System	**CO1:**know the basic concepts, design and engineering associated with parallel computing environment **CO2:**gather the decomposition techniques and load balancing in parallel algorithm design **CO3:**illustrate the sources of overhead and performance issues of parallel algorithms & applications. **CO4:**demonstrate the APIs of Message Passing Interfaces and shared address space platforms. **CO5:**design an parallel system applications using MPIs and shared address space platforms for large-scale parallel systems with an OpenMP. **CO6:**analyze the various parallel algorithms and its applications.
	17CIC56	Web Technology	**CO1:**Understand the concepts of XHTML and Web Resources. **CO2:**Analyze and build the dynamic web sites using Dynamic HTML. **CO3:**Implement different concepts in Java script. **CO4:**Design web applications using XML. **CO5:**Analyze and report the use of Web Servers in real time applications. **CO6:**Use web development tools like PHP, JSP and JDBC techniques.

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17CIC53L	Database Systems Laboratory	**CO1:**Understand basic database concepts, including the structure and operation of the relational data model. **CO2:**Understand and successfully apply logical database design principles, including E-R diagrams and database normalization. **CO3:**apply data manipulation language commands to query, update and manage Student database **CO4:**apply data manipulation language commands to query, update and manage Employee database **CO5:**apply data manipulation language commands to query, update and manage Library database **CO6:**Design and develop a mini project by understanding the essential DBMS concepts
	17CIC55L	Parallel Computing Laboratory	**CO1:**Understand the concept of parallel computing and familiarize with programming in OpenMP. **CO2:**Implement the concept of parallel execution for easier programming **CO3:**Analyze different types of Scheduling clauses **CO4:**Demonstrate Multitasking concepts using OpenMP **CO5:**Calculate CPU time for tasks executing in Parallel region **CO6:**Illustrate multi-tasking in Shared Memory environment
	17CS57S	Scripting Language Laboratory	**CO1:**Demonstrate the functions and pass arguments in Python. **CO2:**Develop Python programs to read and write files in. **CO3:**Design the object-oriented programs with Python classes. **CO4:**Implement the lists, tuples, and dictionaries in Python programs. **CO5:**Utilize the exception handling in Python applications for error handling. **CO6:**Design Python applications using django

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17CS58S	Network Simulator Lab	**CO1:**Trace the flow of information from one node to another node in the network **CO2:**Define the different agents and their applications like TCP, FTP over TCP, UDP, CBR and CBR over UDP etc **CO3:**Understand the basic concepts of application layer protocol design including client/server models **CO4:**Design and work with a congestion control algorithm (Traffic shaping: Leaky bucket) and publickey encryption system **CO5:**Analyze the performance of the protocols in different layers. **CO6:**Demonstrate the working of different concepts of networking
VI	17CIC61	Advance Computer Networks	**CO1:**Independently understand computer network technology and Identify the different types of network topologies and protocols. **CO2:I**dentify the different types of network devices and their functions within a network and Familiarity with the basic protocols, VLANs, VTP , WAN, ATM in a networks **CO3:**Analyze existing network protocols and networks **CO4:**Ability to apply knowledge of Advanced Network Engineering including design, routing, management, security and performance **CO5:**Demonstrate Knowledge of contemporary issues in wifi and 802.11 networks **CO6:**Demonstrate design knowledge on smart networks
	17CS62	**Professional Ethics & IPR**	**CO1:**Understand the scope and aims of Engineering Ethics **CO2:**Express the importance of Professions, Professionalism, Professional ideas and virtues **CO3:**Discuss the Ethical theories about right action and codes of Ethics **CO4:**Compare the Responsibility of Engineers towards safety and Responsibility of Employers towards employees **CO5:**Summarize the laws about Intellectual Property Right **CO6:**Interpret the Application Process of Patents and Trademarks

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17CS63	Machine Learning	**CO1:**Discuss the fundamentals of Machine Learning (ML). **CO2:**Explain the need of ML, working and types of the learning techniques. **CO3:**Summarize intelligent algorithms for data analysis. **CO4:A**pply the understanding of ML methods in societal and finance problems **CO5:**Implement suitable ML techniques for appropriate problems. **CO6:**Analyse the performance of ML techniques applied for real world problems
	17CS64	Linux Internals	**CO1:**Explain the Linux History, their Architecture and Linux commands related to files. **CO2:**Interpret all the Linux commands with respect to file contents. **CO3:**Demonstrate the Linux File Trees and it's structure. **CO4:**Construct Linux scripting programs and execute related commands. **CO5:**Produce Linux scripts using variables and different parameters. **CO6:**Demonstrate the process related commands in Linux environment.
	17CSDE651	Advanced DBMS	**CO1:**Explain the overview of Object Database Concepts and their design **CO2:**Express knowledge on disk storage and operations on files **CO3:**Discuss the different Distributed Database Concepts and Transaction Management **CO4:**Apply NOSQL queries using Mongo DB **CO5:**Discuss the concepts of Information Retrieval and to analyze the trends in Information Retrieval **CO6:**Summarize the concepts of data mining and its applications

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17CSDE652	Mobile computing	**CO1:**Understand the concepts of Mobile Devices and Systems, Architectures **CO2:**Analyze the concepts of CDMA based communication and Mobile IP Network Layer. **CO3:**Apply different Databases Techniques and Data Synchronization in Mobile Computing Systems. **CO4:**Classify Data Dissemination and Broadcasting Systems. **CO5:**Implement Mobile apps development for real time applications. **CO6:**Design the Building blocks of mobile applications.
	17CSDE653	Image processing	**CO1:**Investigate Image processing fundamentals **CO2:**Analyze different denoising and filtering techniques **CO3:**apply various segmentation techniques **CO4:**Implement fundamental image processing techniques **CO5:**Implement algorithms working with color images **CO6:**Gain hands-on experience using MATLAB tool.
	17CSDE661	Cryptography & Network Security	**CO1:**Demonstrate classical encryption methods **CO2:**Summarize the concept of Block Cipher and DES **CO3:**Understand the concept of Public Key Cryptography **CO4:**Explain Hash functions and Digital Signatures **CO5:**Analyze Cryptographic algorithms on Time-Memory Trade-Off attack and Stream Cipher **CO6:**Present to original research in advanced network security issues & technologies

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17CSDE662	Cloud Computing	**CO1:**Understand the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing. **CO2:**Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc. **CO3:**Analysis the core issues of cloud computing such as security, privacy, and interoperability. **CO4:**Compare virtualization tools to understand different types of hypervisors and create VM's **CO5:**Identify problems, and explain, analyze, and evaluate various cloud computing solutions. **CO6:**Develop new ideas and innovations in cloud computing
	17CSDE663	IoT	**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 **CO6:**Identify the Applications of IoT in Industry.
	17CIC61L	AdvancedComputer Networks Lab	**CO1:**Configure IPv4 addressing and VLSM **CO2:**Design network for given specific requiremnts **CO3:**Impliment Static, dynaramic routing protocols like RIPv1,RIPv2, OSPF. **CO4:**Design VLAN, Inter VLAN, VTP protocals and Frame relay **CO5:**Do troubleshooting that a computer network has been properly configured **CO6:**Demonstrate working knolwdge with Physical router and switches

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17CIC61L	Linux Internals Lab	**CO1:**work with UNIX system files and understand it's system directory structure **CO2:**understand the commands on UNIX file attributes **CO3:**Gain knowledge about browsing through the contents of any file through commands **CO4:**Design the small shell script programs having variables and programming constructs **CO5:**Demonstrate with regular expressions available in UNIX **CO6:**Work with Input/Output Redirection and process control mechanism
	17CS67L	Software Engineering and Testing Lab	**CO1:**Able to prepare SRS document, design document, test cases. **CO2:**Classify software applications and Identify unique features of various domains. **CO3:**Translate a requirement specification into an implementable design, following a structured and organized process **CO4:**Employ group working skills including general organization, planning and time management and inter group negotiation. **CO5:**Formulate testing strategy for a software system, employing techniques such as unit testing, functional testing. **CO6:**Apply quality attributes in software development life cycle
VII	17CSDE711	Pattern Recognition	**CO1:**Explain and define concepts of pattern recognition **CO2:**Understand the Bayesian approach to pattern recognition **CO3:**Perform feature extraction and selection through various algorithms **CO4:**combine various classifiers and boost their performance **CO5:**apply Markov's approach for pattern recognition **CO6:**apply clustering for pattern recognition

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17CSDE712	High performance Network	**CO1:**Apply the packet switched network and its function to real world example **CO2:**Examine the technologies used in high speed digital and broadband access **CO3:**Categorize the major techniques involved and network issues for the implementation of high speed network **CO4:**Analyze the key component and technologies involved in building a multicast network and its application **CO5:**Outline the network design using wireless network and its standards **CO6:**Evaluate the network performance and its protocol
	17CSDE713	Data Warehousing and mining	**CO1:**Explain the functionality of various data warehouse models. **CO2:**Discuss the different modelling used in data warehousing and to explore data mining principles and techniques. **CO3:**Select an appropriate algorithm to solve analytical problems. **CO4:**Apply the techniques of data mining on real world data. **CO5:**Demonstrate different clustering techniques. **CO6:**Classify the concepts of clustering.
	17CSDE714	Agile PrinciplesPatterns and Practices	**CO1:**Understand agile principles, practice and methodologies. **CO2:**Analyze and perform extreme programming **CO3:**Plan, test and how to refactor the software **CO4:**Understand and implement SRP, OCP, LSP in software design **CO5:**Develop class diagram, state diagrams, FSM, UML, object diagram **CO6:**Analyze different payroll case study

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17CSDE721	AI	**CO1:**Demonstrate awareness of artificial intelligence (AI) and its foundations. **CO2:**Analyze the various AI search algorithms (Un-informed, Informed, Heuristic, Constraint Satisfaction)for e-domain application systems **CO3:**Demonstrate about AI techniques for knowledge representation, planning and uncertainty management **CO4:**Develop knowledge of decision making and learning methods **CO5:**Demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information **CO6:**Apply principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
	17CSDE723	Big Data Analytics	**CO1:**Explain the concepts of big data for business intelligence. **CO2:**Demonstrate the concepts of Hadoop and Mapreduce process. **CO3:**Investigate the Hadoop Distributed File system. **CO4:**Construct MapReduce analytics using Hadoop and related tools. **CO5:**Apply tools and techniques for Hadoop cluster setup. **CO6:**Demonstrate using cloudera using Hadoop properties
	17CSDE724	Software Project Management	**CO1**:Exhibit the software project management. **CO2:**Determine and classify the project life cycle and estimate the effort of Agile methods. **CO3:**Formulate the project activity plan and project risk management **CO4:**Organize and manage the project contracts. **CO5:**Establishing the staffing pattern and Document the organizational behavior **CO6:**Apply project management concepts through working in a group as team leader or active team member on an IT project.

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17CSDE731	Artificial Neural Networks	**CO1:**Remember the basic fundamentals of Deep Learning Techniques and need for ANN **CO2:**Understand different types of networks and classification of single and multi-layer feed-forward neural networks **CO3:**Differentiate and understand linear and nonlinear models, and training of neural networks using various learning rules **CO4:**Apply neural networks to classification and recognition problems, and other societal problems using tools **CO5**:Analyze the performance of learning algorithms for multilayer perceptrons, radial-basis function networks, and Kohonen self-organising maps using tools **CO6:**Evaluate the outcome and effect of different learning algorithms for various types of networks for real – life problems using tools
	17CSDE733	Web Semantics	**CO1:**Understand Semantic web **CO2:**Creating structured web documents in XML **CO3:**Describe web resources **CO4:**Understand and use WOL **CO5:**Understand & apply ontology engineering to various problems
	17CSDE734	Software QualityAssurance	**CO1:**Understand the components and importance of Quality Assurance in software **CO2:**Design test cases and test scenarios **CO3:**Apply various Manual testing strategies **CO4:**Apply various Automated testing strategies **CO5:**Illustrate the software quality models and metrics **CO6:**Interpret he software quality management standards

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17CSDE741	Fuzzy Systems	**CO1:**Remember the basic fundamentals of fuzzy sets and fuzzy logic **CO2:**Understand basic fuzzy inference, approximate reasoning and fuzzy systems. **CO3:**Dfferentiate classical and fuzzy logic & sets with adequate techniques, along with membership and relations. **CO4:**Apply basic fuzzy system modeling methods for various decision making, classification and pattern recognition real world problems. **CO5:**Analyze application of fuzzy logic control to real time systems and automated fuzzy systems. **CO6:**Evaluate the performance of various Fuzzy Systems with Fuzzification & Defuzzification techniques.
	17CSDE742	Internet Routing Architecture & Protocols	**CO1:**Illustrate the challenges of interfacing the internet and steps involved in building scalable internetworks **CO2:**Explain the need of routing protocols and Ip addressing techniques **CO3:**Apply the BGP routing protocol for autonomous systems and Multiprotocol Extensions for BGP **CO4:**Distinguish the key components and technologies involved in internet routing designs **CO5:**Analyze and understand the redundancy symmetry and load balancing **CO6:**Examine the BGP routing protocol in controlling Routing inside the Autonomous system and large scale autonomous systems
	17CSDE743	Social Network Analytics	**CO1:**Discuss the different components of a web social network that can be used for analyzing and mining. **CO2:**Differentiate the different data structures and graph algorithms that can be used for web social network mining. **CO3:**Compile the social network data set from existing social networking sites. **CO4:**Develop an application that uses various aspects of Social Network Mining to improve its functionality and to harvest information available on the web to build recommender systems **CO5:**Examine the Social Network data using MapReduce paradigm **CO6:**Analyze social media data using appropriate data/web mining techniques

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17CSDE744	Total Quality Management	**CO1:**Understand the concepts of Quality and Total Quality Management **CO2:**Apply customer orientation, satisfaction, complaints and retention **CO3:**Interpret Employee involvement, Recognition & Reward and Performance appraisal **CO4:**Illustrate various techniques for Continuous Process Improvement **CO5:**Demonstrate various tools and techniques of TQM **CO6:**Summarize ISO Quality management standards
VIII	17AEOE811	Egineering Management and Ethics	**CO1:** Comprehend and evaluate the basic principles of the fundamentals of engineering management **CO2:** Identify and apply appropriate management techniques for managing contemporary organizations **CO3:**Demonstrate an understanding of personnel management and motivational theories **CO4:** Distinguish between ethical and non-ethical situations **CO5:** Practice moral judgment in conditions of dilemma **CO6:**Apply risk and safety measures in various engineering fields
	17CEOE811 -	Environment Impact Assessment	**CO1:**Understand the EIA concepts and importance of balance between environment and project development **CO2:**Apply relevant EIA techniques in different case studies:understand and apply the environmental policies and laws **CO3:**Analyze the impact of development project **CO4:**Evaluate EIA report for different development projectstechniques

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17DSOE811	Exploratory Data Analysis	**CO1**:Classify the different types of data: based on observation, measurement, availability, inherent nature and structural form and understanding the concept of sample data and population. **CO2**:Describe data analysis and its different techniques and different visualization methods used in Exploratory Data Analysis. **CO3:**Illustrate the different phases of data preparation. **CO4:**Demonstrate the concept of univariate data analysis by considering real time data sets. **CO5:**Examine the different graphical representations used for EDA and to perform bivariate analysis to analyze the data**.** **CO6:**Recommend an appropriate predictive modelling for the given data set.
	17MTOE811 -	Industrial Management	**CO1:**Understand the problems and versatile of management used in industries **CO2:**Study and forecasting the organization plant using different tools **CO3:**Solve the assignment and scheduling problems **CO4:**Illustrate the project management and personal management functions
	17AEOE822	Basic of Research and Development	**CO1:**Understand the basic concepts of R&D **CO2:**Understand the research process and methodology in R&D **CO3:**Understand the types of R&D **CO4:**Understand the research methodology of R&D **CO5:** Understand the admin and evaluation process of R&D **CO6:**Understand the future of R&D organizations

Semester	Course Code	CourseName	CourseOutcomes(COs)
	17AEOE821	Operation Management	**CO1:**Comprehend organization objectives and functionss and understand, evaluate & apply issues in services & manufacturing operations **CO2:**Be able to understand trends and developments in operation management and use them for design of operations systems elements & their modifications **CO3:**Demonstrate an understanding of role and importance of planning and scheduling, hierarchy in planning, Strategic planning, business plan, operations strategy **CO4:**Comprehend strategic and tactical decision making and Apply and carry out techniques of aggregate planning and master scheduling, operational decision making. **CO5:**Comprehend forecasting and be able to apply forecasting tools and carry out capacity planning, disseminate & use data in all concerned functional areas **CO6:**Demonstrate an understanding of materials management, Supply chain management, its evolution, objectives, processes and techniques, functions of inventory control, inventory costs and purchase and apply the understanding to manage supply chain elements.
	17CTOE821	CLOUD WEB SERVICES	**CO1:**Recognize various cloud services available on a given cloud and provision various IT services at different deployment models. **CO2:**Describe various services provided by AWS for the respective service requirements. **CO3:**Implement the instances, web applications and load balancing through the appropriate AWS services. **CO4:**Examine the various storage and security services provided by AWS for the instances. **CO5:**Utilize the networking services of AWS as per the requirements. **CO6:**Analyze the various scenarios of networking and choose the appropriate services required.
	17EEOE821	Emerging Technologies in Power Generation	**CO1:**Demonstrate the principles of new power generation technologies **CO 2**: Analyze the characteristics of fuel cells **CO 3** :Summarize the energy conservation methods of Hydrogen storage systems **CO 4:** Formulate the components of MHD generators and safety precautions involved with it.

	17CSPW02	Project Works	**CO1:**Manage the selection and initiation of individual projects and of portfolios of projects in the enterprise **CO2:**Conduct project planning activities that accurately forecast project costs, timelines, and Conduct project planning activities that accurately forecast project costs, timelines, and change management **CO3:**Demonstrate effective project execution and control techniques that result in successful project **CO4:**Conduct project closure activities and obtain formal project acceptance. **CO5:**Demonstrate a strong working knowledge of ethics and professional responsibility **CO6:**Exhibit and publish the implemented work in reputed journals