B.E. Program Outcomes (PO's)

Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization for the solution ofcomplex engineering problems
Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Design/development of solutions: 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.

Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation ofdata, and synthesis of the information to provide valid conclusions.

Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling to complex engineering activities, with an understanding of the limitations.

The engineer and society: Apply reasoning informed by the contextual knowledgeto assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Ethics: Apply ethical principles and commit to professional ethics andresponsibilities and norms of the engineering practice.

Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

Communication: 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.

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Project management and finance: 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 multidisciplinaryenvironments.

Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technologicalchange.

R20:

Department Vision
To be in the frontiers of Computer Science and Engineering with academicexcellence and Research.

Department Mission
The mission of the Computer Science and Engineering Department is to:

1. Educate students with the best practices of Computer Science by integrating the latest research into the curriculum.
2. Develop professionals with sound knowledge in theory and practice of Computer Science and Engineering.
3. Facilitate the development of academia-industry collaboration and societal outreach programs.
4. Prepare students for full and ethical participation in a diverse society and encourage lifelong learning.

PROGRAM EDUCATION OBJECTIVES (PEOs):
After the completion of theprogram, our:

1. Graduates will apply their knowledge and skills to succeed in their careers and/or obtain advanced degrees, provide solutions as entrepreneurs.
2. Graduates will creatively solve problems, communicate effectively, and successfully function in multidisciplinary teams with superior work ethics and values.
3. Graduates will apply principles and practices of Computer Science, mathematics and Science to successfully complete hardware and/or software-related engineering projects to meet customer business objectives and/or productively engage in research.

PROGRAM SPECIFIC OUTCOMES (PSOs):
At the end of the program:

1. Acquire knowledge and practical competency through emerging technologies and open-source platforms.
2. Design and develop solutions to real world problems by applying the concept of algorithms, networking, web design, deep learning, and data analytics.
3. Provide innovative secure products using standard software engineering Practices.

R18:

Department Vision: To become a center of excellence in the field of Computer Science and Engineering that produces innovative, skillful and socially responsible professionals who can contribute significantly to industry and research.

Department Mission:

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The Mission of Computer Science and Engineering Department is to:

1. Identifying emerging areas in the field of Computer Science & Engineering and incorporating in the curriculum.
2. Providing professionals to the country with innovative ideas in certain areas of advanced computing technologies through research and graduate studies.
3. Participation in the design and developmental process of industries and society.

Program Education Objectives (PEOs):

After the completion of the program, our:

1. Practice their profession with confidence by applying new ideas and technologies for the sustainable growth of Industry & Society.
2. To pursue higher studies for professional growth with superior ethics and Character.
3. Engage in Research leading to innovations/products or become a successful Entrepreneur.

Program Specific Outcomes (PSOs):

At the end of the program:

PSO 1: Machine Learning and Computer Vision: Demonstrate knowledge and understanding of the engineering and management principles and apply these toone's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PSO 2: Open source Technologies: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in thebroadest context of technological change.

R16:

Department Vision:

To become a center of excellence in the field of Computer Science and Engineering that produces innovative, skillful and socially responsible professionals who can contribute significantly to industry and research.

Department Mission:

The mission of Computer Science and Engineering Department is to:

1. To provide a curriculum that balances engineering fundamentals, modern technologies and research.
2. To provide opportunities for solving practical problems.
3. To provide opportunities for overall personality development.

Program Education Objectives (PEOs):

After the completion of the program, our:

1. Practice their profession with confidence by applying new ideas and technologies for the sustainable growth of Industry and Society.
2. To pursue higher studies for professional growth with superior ethics.
3. Engage in Research leading to new products or become a successful entrepreneur.

Program Specific Outcomes (PSOs):

At the end of the program, Graduates able to:

1. Knowledge and skills in the areas of Computer Vision and Machine Learning
2. Create Innovative career paths through Open Source Technologies.

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Department Of Computer Science and Engineering
Course Outcomes Statements for BE (CSE)-R20

SNo	Course		Course Outcomes Statements
	Code	Name	
1.	20MT C01	Linear Algebra & Calculus	Apply the Matrix Methods to solve the system of linear equations
			Test the convergence and divergence of the infinite Series.
			Determine the extreme values of functions of two variables.
			Apply the vector differential operator to scalar and vector functions
			Solve line, surface & volume integrals by Greens, Gauss and Stoke's theorems.
2.	20EG C01	English	Illustrate the nature, process and types of communication and communicate effectively without barriers.
			Construct and compose coherent paragraphs, emails and adhering to appropriate mobile etiquette.
			Apply techniques of precision to write a précis and formal letters by using acceptable grammar and appropriate vocabulary.
			Distinguish formal from informal reports and demonstrate advanced writing skills by drafting formal reports.
			Critique passages by applying effective reading techniques
3.	20PY C01	Optics and Semiconductor Physics	Demonstrate the physical properties of light.
			Explain characteristic properties of lasers and fiber optics
			Find the applications of quantum mechanics
			Classify the solids depending upon electrical conductivity
			Identify different types of semiconductors
4.	20CS C01	Programming for Problem Solving	Identify and understand the computing environments for scientific and mathematical problems.
			Formulate solutions to problems with alternate approaches and represent them using algorithms / Flowcharts.
			Choose data types and control structures to solve mathematical and scientific problem.
			Decompose a problem into modules and use functions to implement the modules.
			Apply arrays, pointers, structures, and unions to solve mathematical and scientific problems.
			Develop applications using file I/O.
5.	20MT C02	Linear Algebra & Calculus Lab	Apply the Matrix operations in executing various programmes.
			Test the convergence and divergence of the infinite Series.
			Explore the extreme values of functions of two variables.
			Determine the gradient, divergent and curl of scalar and vector point functions.
			Solve line, surface & volume integrals by Greens, Gauss and Stoke's theorems
6.	20EG C02	English lab	Define the speech sounds in English and understand the nuances of pronunciation in English
			Apply stress correctly and speak with the proper tone, intonation and rhythm.
			Analyze IELTS and TOEFL listening comprehension texts

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SNo	Course		Course Outcomes Statements
	Code	Name	
			to enhance their listening skills.
			Determine the context and speak appropriately in various situations.
			Design and present effective posters while working in teams, and discuss and participate in Group discussions.
7.	20PY C03	Optics and Semiconductor Physics Lab	Interpret the errors in the results of an experiment.
			Demonstrate physical properties of light experimentally
			Make use of lasers and optical fibers for engineering applications
			Explain the V-I characteristics of some optoelectronic and semiconductor devices
			Find the applications thermistor
8.	20CS C02	Programming for problem Solving Lab	Identify and setup program development environment.
			Design and test programs to solve mathematical and scientific problems.
			Identify and rectify the syntax errors and debug program for semantic errors
			Implement modular programs using functions.
			Represent data in arrays, pointers, structures and manipulate them through a program.
			Create, read, and write to and from simple text files.
9.	20ME C01	CAD and DRAFTING	Become conversant with appropriate use of CAD software for drafting.
			Recognize BIS, ISO Standards and conventions in Engineering Drafting.
			Construct the projections of points, lines, planes, solids
			Analyse the internal details of solids through sectional views
			Create an isometric projections and views
10.	20MB C02	Community Engagement	Gain an understanding of Rural life, Culture and Social realities.
			Develop a sense of empathy and bonds of mutuality with Local Communities.
			Appreciate significant contributions of Local communities to Indian Society and Economy.
			Exhibit the knowledge of Rural Institutions and contributing to Community's Socio-Economic improvements.
			Utilise the opportunities provided by Rural Development Programmes.
11.	20MT C03	Differential Equations & Transform Theory	Calculate the solutions of first order linear differential equations.
			Calculate the solutions of higher order linear differential equations.
			Examine the series solutions for higher order differential equations.
			Evaluate the Improper integrals by Fourier Transform.
			Solve the difference equations byZ-transforms.
12.	20CYC01	Chemistry	Identify the microscopic chemistry in terms of molecular orbitals, intermolecular forces and rate of chemical reactions.
			Discuss the properties and processes using thermodynamic functions, electrochemical cells and their role in batteries and fuel cells.

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SNo	Course		Course Outcomes Statements
	Code	Name	
			Illustrate the major chemical reactions that are used in the synthesis of organic molecules.
			Classify the various methods used in treatment of water for domestic and industrial use.
			Outline the synthesis of various Engineering materials & Drugs.
13.	20CS C05	Industry 4.0	Identify the key drivers and enablers of Industry4.0
			Describe the smartness in smart factories, smart cities, smart products, ad smart services
			Determine various systems used in manufacturing plants, and their role in an Industry 4.0world
			Illustrate the power of Cloud Computing in a networked economy
			Understand the opportunities, challenges, brought about by Industry 4.0 and how organizations and individuals should prepare to reap the benefits
14.	20CS C03	Object Oriented Programming	Demonstrate the concepts of Object-Oriented Programming languages to solve problems.
			Apply the constructs like selection, repetition, functions and packages to modularize the programs.
			Design and build applications with classes/modules.
			Find and rectify coding errors in a program to assess and improve performance.
			Develop packages for solving simple real world problems.
			Analyze and use appropriate library software to create graphical interface, mathematical software.
15.	20MT C04	Differential Equations &Transform Theory Lab	Explore all the possible solutions of first order differential equation.
			Analyse the solutions of higher order linear differential equations.
			Examine the series solutions for higher order differential equations.
			Evaluate the Improper integrals by Fourier Transform.
			Apply the Z-transform to solve the difference equations.
16.	20CYC02	Chemistry Lab	Identify the basic chemical methods to analyse the substances quantitatively & qualitatively.
			Estimate the amount of chemical substances by volumetric analysis.
			Determine the rate constants of reactions from concentration of reactants/ products as a function of time.
			Calculate the concentration and amount of various substances using instrumental techniques.
			Develop the basic drug molecules and polymeric compounds.
17.	20CSC04	Object Oriented Programming Lab	Inspect and identify suitable programming environment to work with Python.
			Choose appropriate control constructs, data structures to build the solutions.
			Develop the solutions with modular approach using functions, packages to enhance the code efficiency.
			Analyze and debug the programs to verify and validate code.
			Demonstrate use of STLs and modules to build graphical

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SNo	Course		Course Outcomes Statements
	Code	Name	
			interfaces, mathematical software.
			Determine the requirements of real-world problems and use appropriate modules to develop solutions.
18.	20ME C02	Workshop / Manufacturing Practice	Understand safety measures to be followed in workshop to avoid accidents.
			Identify various tools used in fitting, carpentry, tin smithy, house wiring, welding, casting and machining processes.
			Make a given model by using workshop trades including fitting, carpentry, tinsmithy and House wiring.
			Perform various operations in welding, machining and casting processes.
			Conceptualize and produce simple device/mechanism of their choice.
19.	20ME C03	Engineering Exploration	Understand the role of an engineer as a problem solver.
			Identify multi-disciplinary approaches in solving an engineering problem.
			Build simple systems using engineering design process.
			Analyze engineering solutions from ethical and sustainability perspectives.
			Use basics of engineering project management skills in doing projects.
20.	20EEC01	Basic Electrical Engineering	Understand the concepts of Kirchhoff's laws and to apply them in superposition, Thevenin's and Norton's theorems to get the solution of simple dc circuits
			Obtain the steady state response of RLC circuits with AC input and to acquire the basics, relationship between voltage and current in three phase circuits.
			Understand the principle of operation, the emf and torque equations and classification of AC and DC machines
			Explain various tests and speed control methods to determine the characteristic of DC and AC machines.
			Acquire the knowledge of electrical wiring, types of wires, cables used and Electrical safety precautions to be followed in electrical installations.
			Recognize importance of earthing, methods of earthing and various low-tension switchgear used in electrical installations
21.	20ECC35	Basic Electronics	Interpret the usage of semiconductor devices in making circuits like rectifiers, filters, regulators etc
			Design and Analyse the characteristics of electronic circuits and systems
			Make use of various types of small and large signal amplifiers for electronic control systems.
			Model a prototype module using the operational amplifier for real time applications.
			Evaluate the performance of various semiconductor devices.
22.	20CSC08	Data Structures	Understand the basic concepts of data structures and sorting techniques.
			Analyze the performance of algorithms.
			Distinguish between linear and non-linear data structures.
			Apply linear and non-linear data structures.
			Identify the significance of balanced search trees, graphs and hashing.
			Establish a suitable data structure for real world applications.

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SNo	Course		Course Outcomes Statements
	Code	Name	
23.	20CSC09	Discrete Mathematics	Describe rules of inference for Propositional and Predicate logic.
			Demonstrate use of Set Theory, Venn Diagrams, relations, functions in Real-world scenarios.
			Model solutions using Generating Functions and Recurrence Relations.
			Determine the properties of graphs and trees to solve problems arising in computer science applications.
			Distinguish between groups, semi groups and monoids in algebraic systems.
			Formulate solutions to a variety of real world problems.
24.	20CSC10	Digital Logic Design	Demonstrate the number system conversions and simplify Boolean functions.
			Recall basic theorems and properties of Boolean algebra to represent logical functions in canonical and standard forms.
			Analyze and simplify Boolean expressions using karnaugh-maps and tabulation method.
			Analyze and Design various combinational circuits and Sequential circuits used in Computer Hardware.
			Understand the designs of Combinational and Sequential circuits using Verilog HDL.
			Develop different applications by configuring registers, counters and memories.
25.	20EGM02	Indian Traditional Knowledge	Understand philosophy of Indian culture
			Distinguish the Indian languages and literature
			Learn the philosophy of ancient, medieval and modern India
			Acquire the information about the fine arts in India
			Know the contribution of scientists of different eras.
26.	20EEC02	Basic Electrical Engineering Lab	Get an exposure to common electrical components, their ratings and basic electrical measuring equipment.
			Make electrical connections by wires of appropriate ratings and able to measure electric power and energy.
			Comprehend the circuit analysis techniques using various circuital laws and theorems.
			Determine the parameters of the given coil and calculate the time response of RL & RC series circuits.
			Recognize the basic characteristics of transformer and components of switchgear.
			Understand the basic characteristics of dc and ac machine by conducting different types of tests on them.
27.	20ECC36	Basic Electronics Lab	Demonstrate the concepts of basic electronic components, devices, and systems.
			Analyze the measurements of time period, amplitude and phase of different waveforms.
			Design and analyze the behavior of the diode and transistor circuits
			Develop various types of feedback and power amplifiers
			Examine the functionality of various analog and digital circuits
28.	20CSC11	Data Structures Lab	Implement the abstract data type.
			Implement linear data structures such as stacks, queues using array and linked list.
			Implement non-linear data structures such as trees, graphs.
			Analyze various sorting techniques.

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SNo	Course		Course Outcomes Statements
	Code	Name	
			Analyze various algorithms of linear and nonlinear data structures.
			Design and develop real world problem using suitable data structures.
29.	20CSI01	MOOCs / Training / Internship	
30.	20ACT	Activity Points	
31.	20MTC13	Mathematical Foundation for Data Science & Security	Analyze the coefficient of skewness and fitting of the data by various methods
			Apply properties of Mathematical Expectations and analyse the various distributions.
			Evaluate areas of curves by using various distributions.
			Apply various technics of Number Theory for solving problems
			Apply RSA –PKC for solving security issues.
32.	20CSC12	Design and Analysis of Algorithms	Identify and apply asymptotic notations to measure the performance of algorithms.
			Describe the algorithmic design techniques of divide and conquer, greedy, dynamic programming, backtracking and branch and bound to solve problems.
			Apply suitable algorithmic design techniques to solve problems to get optimal solution.
			Analyze the performance of algorithmic design techniques.
			Evaluate the efficiency of alternative solutions derived for a problem by applying various algorithmic design techniques.
			Formulate approximate solutions to NP problem.
33.	20CSC13	Computer Architecture and Microprocessor	Understand the functional block diagram of single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.
			Design assembly language program for specified computing 16 bit multiplication, division and I/O device interface.
			Derive flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process.
			Design a memory module and analyze its operation by interfacing with the CPU.
			Apply design techniques to enhance performance using pipelining, parallelism and RISC methodology.
			Develop testing and experimental procedures on Microprocessor and analyze their operation under different cases.
34.	20CSC14	Data Base Management Systems	Classify the difference between FMS and DBMS; describe the roles of different users and the structure of the DBMS .Design the database logically using ER modeling.

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SNo	Course		Course Outcomes Statements
	Code	Name	
			Outline the schema of the relational database and key constraints. Develop queries using fundamental, extended operators of relational algebra and DDL, DML and DCL of SQL .
			Explore the inference rules for functional dependencies and apply the principles of normal forms to decompose the relations in a database.
			Summarize the concepts of dense, sparse ,ISAM and B+ tree indexing and get familiar with static and extendable techniques of hashing .
			Explain the states and properties of transaction. Interpret the locking, time stamp, graph and validation based protocols for concurrency control.
			Relate log based, ARIES recovery techniques to increase the robustness of the database, identify to resolve the deadlocks in the transaction.
35.	20CSC15	Internet & Web Technologies	Understand the technologies required for developing web application.
			Identify and choose XHTML tags, CSS and java scripts to develop well-structured and easily maintained web pages.
			Design and Develop interactive and innovative web pages using various platforms/technologies like XHTML, CSS, XML, JAVASCRIPT.
			Create and deploy web applications in web server by using server-side programming concepts like Python.
			Build a data driven web site using different frameworks and Databases.
			Evaluate different web applications to implement optimal solutions for real time problems.
36.	20MBC01	Engineering Economics & Accountancy	Apply fundamental knowledge of Managerial Economics concepts and tools.
			Analyze various aspects of Demand Analysis, Supply and Demand Forecasting.
			Understand Production and Cost relationships to make best use of resources available.
			Apply Accountancy Concepts and Conventions and preparation of Final Accounts.
			Evaluate Capital and Capital Budgeting decision based on any technique.
37.	20MTC14	Mathematical Foundation for Data Science & Security Lab	Analyze the coefficient of skewness and fitting of the data by various methods
			Apply properties of Mathematical Expectations and analyze the various distributions.
			Evaluate areas of curves by using various distributions.
			Apply various technics of Number Theory for solving problems
			Apply RSA –PKC for solving security issues.
38.	20CSC16	Design and Analysis of Algorithms Lab	Implement greedy, dynamic programming, backtracking and branch and bound techniques.
			Demonstrate various algorithmic design techniques.
			Analyze the performance of various algorithms.
			Compare various design strategies.
			Formulate solutions to solve real world problems use acquired knowledge.
39.	20CSC17	Data Base Management	Outline the built-in functions of SQL and apply these

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SNo	Course		Course Outcomes Statements
	Code	Name	
		Systems Lab	functions to write simple and complex queries using SQL operators.
			Demonstrate Queries to Retrieve and Change Data using Select, Insert, Delete and Update. Construct Queries using Group By, Order By and Having Clauses.
			Demonstrate Commit, Rollback, Save point commands, SQL Plus Reports and formulate the Queries for Creating, Dropping and Altering Tables, Views, constraints.
			Develop queries using Joins, Sub-Queries and Working with Index, Sequence, Synonym, Controlling Access and Locking Rows for Update, Creating Password and Security features.
			Demonstrate the usage of data types , Bind and Substitution Variables , Anchored, Declarations , Assignment Operation and PL/SQL code using Control Structures .
			Develop PL/SQL code using Cursors, Exception, Composite Data Types and Procedures, Functions and Packages.
40.	20CSC18	Internet & Web Technologies Lab	Identify and install web development tools.
			Develop client side web pages using XHTML, CSS and XML.
			Create dynamic, interactive web applications using java script.
			Develop server side web application using Django Frame work.
			Understanding working of Ajax, Node.js and JSON.
			Identify and explore different frame works for web applications.
41.	20ACT	Activity Points	
42.	20CSC19	Formal Language and Automata Theory	Describe language basics like Alphabet, strings, grammars, productions, derivations, and Chomsky hierarchy.
			Recognize regular expressions, formulate, and build equivalent finite automata for various languages.
			Identify closure, decision properties of the languages and prove the membership.
			Demonstrate context-free grammars, check the ambiguity of the grammars and design equivalent PDA to accept.
			Use mathematical tools and abstract machine models to solve complex problems.
			Analyze and distinguish between decidable and undecidable problem.
43.	20CSC20	Operating Systems	Identify the basics of an operating systems and its major components.
			Understand the concepts related to process synchronization and deadlocks.
			Distinguish various memory management techniques.
			Interpret various threats and defense mechanisms used to protect the system.
			Evaluate various file allocation methods.

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SNo	Course		Course Outcomes Statements
	Code	Name	
			Apply security as well as recovery features in the design of algorithms.
44.	20CSC21	Data Communication and Computer Networks	Learn the communication protocol suites like ISO-OSI and TCP/IP.
			Illustrate and explain Data Communications System and its components.
			Identify and analyze various congestion control algorithms.
			Distinguish the internet protocols like IP, ARP, ICMP, IGMP, routing protocols and DHCP.
			Understand the transport layer protocols like TCP, UDP, RTCP.
			Identify various application layer protocols like HTTP, WWW, DNS, Email Protocols, FTP and the underlying protocols.
45.	20CSC22	Software Engineering	State the software process and explain perspective process model, evolutionary process models.
			Understand the agile Software process models and demonstrate the skills necessary to specify the requirements of software product so as to prepare SRS document.
			Recall the modeling concepts and estimate the cost of software using empirical models
			Enlist the design principles and construct a product using coding principles and standards.
			Develop test cases and apply software testing methods in conventional and O-O approaches and estimates software quality of SW.
46.	20CSE01	Image Processing and Computer Vision	Understand basic principles of image processing and its significance in real world.
			Interpret and evaluate various approaches for image. Transformation, segmentation, and restoration.
			Determine and compute object, scene recognition and categorization algorithms for real time images.
			Analyze images and videos for problems such as tracking and structure from motion.
			Appraise recovery of 3D structure of ill-posed scenes.
			Apply various techniques to build computer vision applications.
47.	20CSE02	Advanced Databases	Analyze and evaluate modeling and development methods/techniques in Object-based Databases.
			Understand and analyze query processing and optimization.
			Understand how distributed and parallel databases are implemented, and how applications can be designed for those databases.
			Develop applications for mobility and personal databases.
			Understand and implement cloud-based databases.
			Gain insight into some advanced topics in database such as Performance Tuning, spatial databases, temporal databases.
48.	20CSE03	System Modelling and Simulation	Create a computer simulation based on the physical characteristics of the system.
			Solve ordinary and partial differential equations with computational methods.
			Display insight into the uncertainties in a system and how they can be characterized.

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SNo	Course		Course Outcomes Statements
	Code	Name	
			Manipulate the data structures of numerical computing; matrices, and vectors, and visually represent data sets coming from computer simulations.
49.	20CSE04	Free and Open Source Technologies	Identify various FOSS tools, platforms, licensing procedures and development models, ethics
			Describe various FOSS projects, development models and project management
			Adapt to the usage of FOSS tools and technologies.
			Distinguish between Proprietary and Open Source tools, development methods
			Practice Open Source principles, ethics, and models and to evaluate various Open Source projects like Linux, Apache, GIT, etc.
50.	20CSE05	Optimization Techniques	Calculate the optimum values for given objective function by LPP.
			Solve the solution for maximize the profit with minimum cost by Transportation problem.
			Determine the optimum feasible solution for assignment and travelling salesman problems and computing the optimal solution for Job sequencing models.
			Compute the optimum values for given objective function by IPP and optimal strategy for games.
			Identify critical path using network scheduling.
51.	20ECO10	Fundamentals of Wireless Communication	Understand the overview of Wireless Communication.
			Relate the cellular concepts like frequency reuse, hand off, coverage and capacity.
			Analyse the mobile radio propagation with large scale and small scale fading.
			Select the suitable diversity technique to combat the multipath fading effects.
			Compare the multiple access techniques and apply to wireless standards.
52.	20EEO05	Waste Management	Categorize the waste based on the physical and chemical properties.
			Explain the Hazardous Waste Management and Treatment process.
			Illustrate the Environmental Risk Assessment, methods, mitigation and control.
			Interpret the Biological Treatment of Solid and Hazardous Waste.
			Identify the waste disposal options, describe the design and construction, Operation, Monitoring, Closure of Landfills.
53.	20MEO09	Organizational Behaviour	Understand Organizational Behavioral principles and practices.
			Compare various organizational designs and cultures enabling organizational development.
			Apply motivational theories and leadership styles in resolving employee's problems and decision making processes.
			Understand the group dynamics, communication network, skills needed to resolve organizational conflicts.
			Analyze the behavior, perception and personality of individuals and groups in organizations in terms of the key factors that influence organizational behavior.
54.	20MTO03	Quantum Computing	Compute basic mathematical operations on Quantum bits.

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SNo	Course		Course Outcomes Statements
	Code	Name	
			Execute Quantum operations of Quantum computing
			Built quantum programs
			Develop quantum Logical gates and circuits.
			Develop the quantum algorithm
55.	20BTO04	Bioinformatics	Explain the basic concepts of biology and bioinformatics.
			Identify various types of biological databases used for the retrieval and analysis of the information
			Explain the sequence analysis and data mining.
			Discuss the methods used for sequence alignment and construction of the phylogenetic tree.
			Describe the methods used for gene and protein structure prediction.
56.	20CSC23	Operating Systems Lab	Understand Linux/Unix environment.
			Identify and interpret various system programs.
			Understand and implement shell programming.
			Simulate memory management and file allocation techniques.
			Analyze process and file management system calls by creating and/or modifying concurrent programs.
			Build network-oriented applications using system calls.
57.	20CSC24	Data Communication and Computer Networks Lab	Identify the different types of wiring equipment's used in the networks lab.
			Understand the various network devices like repeater, hub, switch, and routers.
			Practice the basic network configuration commands like ifconfig, ping, traceroute, nslookup, dig, arp, netstat, nmap.
			Design and demonstrate network topologies using GNS3.
			Examine the packet transfer using tcpdump.
			Analyze the network performance using Wireshark or any tool.
58.	20CSC25	Case Studies Using UML Lab	Identify the problem scope and constraints in the problem.
			Prepare software requirements specifications (SRS) for the system according to standards.
			Apply the design notations of structured approach to develop ER and Data Flow Diagrams.
			Apply/Use the design notations of OO approach to develop UML diagrams using rational tools.
			Implement, analyze and prepare the documentation for the proposed system.
59.	20CSI02	Internship – II	
60.	20CSC26	Compiler Design	Identify the concepts related to translator, tokens, bootstrapping porting and phases of the compiler.
			Use grammar specifications and implement lexical analyzer by the help of compiler tools.
			Explore the techniques of Top down, Bottom up Parsers and apply parsing methods for various grammars.
			Implement syntax directed translation schemes and relate Symbol table organization
			Explain the algorithms to generate code for a target machine code and evaluate.

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SNo	Course		Course Outcomes Statements
	Code	Name	
			Recognize the errors and their recovery strategies and understanding advance topics.
61.	20CSC27	Artificial Intelligence	Define the role of agents and interaction with the environment to establish goals.
			Identify and formulate search strategies to solve problems by applying suitable search strategy.
			Understand probabilistic reasoning and Markov decision process to solve real world problems.
			Design applications using Reinforcement Learning.
			Apply AI concepts to solve the real-world problems.
62.	20CSE06	Soft Computing	Understand various soft computing concepts and techniques.
			Analyze and design various learning models.
			Apply the Neural Network Architecture for various Real time applications.
			Examine and approximate reasoning using fuzzy logic.
			Design Genetic algorithms in different applications.
			Develop soft computing techniques to solve different applications.
63.	20CSE07	Internet Of Things	Understand IoT, its hardware and software components.
			Comprehend I/O interface and programming APIs.
			Analyze the use of communication protocols in IoT.
			Explore Solution framework for IoT applications.
			Illustrate unstructured data storage.
			Develop real time IoT based projects.
64.	20CSE08	Enterprise Application Development	Understand the database connectivity and application servers.
			Explore the type of forms with validations using ReactJS.
			Utilize Express framework to develop responsive web applications.
			Demonstrate the architecture and file system of NodeJs.
			Identify the significance of component intercommunication with Angular2.
			Adapt MEAN or MERN stack to implement a real-time web application.
65.	20CSE09	Machine Learning	Define the basic concepts related to Machine Learning.
			Recognize the underlying mathematical relationships across ML algorithms and their paradigms.
			Determine the various applications of Machine Learning.
			Model, design and develop solutions to real world problems using Machine Learning Algorithms.
			Evaluate and interpret the results of the various machine learning tools.
66.	20CSE10	Devops	Identify components of Devops environment.
			Describe Software development models and architectures of DevOps.
			Apply different project management, integration, testing and code deployment tools.
			Investigate different DevOps Software development models.
			Assess various Devops practices.
			Collaborate and adopt Devops in real-time projects.
67.	20CSE11	Natural Language Processing	Understand the basic concepts of Natural language processing pipeline and applications of NLP.
			Illustrate various text representation techniques in NLP.

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	Code	Name	
			Analyse text classification techniques and deep learning basics to process natural language text.
			Explore text summarization methods and example systems.
			Demonstrate levels of NLP for several case studies.
			Apply NLP Pipe lines to solve real world applications.
68.	20CSE12	Embedded Systems	Understand the basics of embedded systems.
			Analyze the core concepts of Embedded System and Embedded System Architecture.
			Design and develop Embedded System hardware and software using Embedded C.
			Analyze the operating system for embedded systems.
			Analyze the embedded system development environment and tools used in embedded software development process.
69.	20CAE04	Algorithmic Game Theory	Acquire knowledge about the real world problems and formulate mathematical models of these problems.
			Identifying the algorithmic Models for finding the optimal solutions for real world examples.
			Analyze the major limitations and capabilities of game theory problems.
			Design and analyze problems using game theory approaches.
			Explore the real world scenarios of economic and algorithmic interactions using game theory solutions.
70.	20CSE13	Adhoc Sensor Networks	Explain the concepts, network architectures and applications of ad hoc and WSN.
			Identify different issues in wireless adhoc and sensor networks.
			Analyze the protocol design issues of adhoc and sensor networks
			Design routing protocols for adhoc and WSN with respect to protocol design issues.
			Evaluate the QoS related performance measurements of adhoc and sensor networks.
71.	20CSE14	Software Quality Testing	Perform white-box and black-box tests in the life cycle of the software product.
			Understand system testing and significance of software reliability.
			Identify defect prevention techniques and SQA metrics.
			Apply various techniques and standards of SQA.
			Reduce potential risks to an acceptable level before they occur.
72.	20ECO01	Remote Sensing and Gis	Demonstrate the understanding of basic concepts of remote sensing and interpret energy interactions.
			Choose an appropriate technique for a given scenario by appreciating the types of remote sensing.
			Distinguish the principle behind the working of microwave and LiDAR sensing.
			Apply Microwave remote sensing techniques
			Explain the procedure for encoding data and geospatial data analysis.
73.	20MTO01	Financial Mathematics	Calculate the internal rate of return, annuity and amortization.
			Apply the portfolio theory.
			Examine the binomial model of pricing.

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SNo	Course		Course Outcomes Statements
	Code	Name	
			Analyze the stochastic differential equations.
			Solve the BSM partial differential equations.
74.	20EEO02	Energy Management Systems	Know the current Energy Scenario and importance of Energy Conservation.
			Understand the concepts of Energy Management, Energy Auditing.
			Interpret the Energy Management methodology, Energy security and Energy Strategy.
			Identify the importance of Energy Efficiency for Engineers and explore the methods of improving Energy Efficiency in mechanical systems, Electrical Engineering systems.
			Illustrate the Energy Efficient Technologies in Civil and Chemical engineering systems.
75.	20EGO01	Technical Writing Skills	Communicate effectively, without barriers and understand aspects of technical communication.
			Differentiate between general writing and technical writing and write error free sentences using technology specific words
			Apply techniques of writing in business correspondence and in writing articles.
			Draft technical reports and technical proposals.
			Prepare agenda and minutes of a meeting and demonstrate effective technical presentation skills.
76.	20CEO02	Disaster Risk Reduction and Management	Identify and understand the concepts of hazards, causes and impacts of disasters.
			Develop a critical capacity to evaluate the principles and practices of disaster risk reduction and management.
			Develop a deep awareness of disaster resilience, risk mitigation, and recovery policies as they arise from natural hazards around the globe.
			Apply knowledge about existing global frameworks and existing agreements and role of community in successful Disaster Risk Reduction.
			Evaluate DM study including data search, analysis and presentation as a case study.
77.	20CHO04	Environmental and Sustainable Development	To relate sustainability concepts and ethical principles towards environment.
			To understand the different types of environmental pollution problems and their respect sustainable solutions.
			To become aware of concepts, analytical methods/models, and resources for evaluating and comparing sustainability implications of engineering activities.
			To critically evaluate existing and new methods.
			To develop sustainable engineering solutions by applying methods and tools to research a specific system design.
			To apply concepts of sustainable development to address sustainability challenges in a global context.
78.	20EGMO3	Universal Human Values-Ii: Understanding Harmony	Students are expected to become more aware of themselves, and their surroundings (family, society, nature)
			They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
			They would have better critical ability.

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			They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
			It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.
79.	20CSC28	Compiler Design Lab	Implement the rules for the analyzing phases of a compiler.
			Apply various Syntax techniques on grammars to build the parsers.
			Generate various intermediate code representations for source code.
			Explore error recovery strategies and implement code optimization, code generation phases.
			Examine the concepts of compiler tools: Lex, FlexVision, Yacc, Turbo C.
80.	20CSC29	Artificial Intelligence Lab	Understand the basic components of library environment and installations.
			Analyze the design heuristics and apply various techniques to solve real world problems.
			Apply variety of algorithms to solve problems.
			Identify how to use GitHub and submit back genuine contributions.
			Implement problems using game search algorithms.
81.	20CSE15	Soft Computing Lab	Implement McCulloh-Pitts model for Boolean operations.
			Apply perceptron learning algorithm for a given problem.
			Design and analyze various Neural Networks Architectures.
			Apply concepts of fuzzy sets on real-time applications.
			Implement Genetic Algorithms with its operators.
			Apply soft computing strategies for various real time applications.
82.	20CSE16	Internet Of Things Lab	Use of various hardware and software IoT components.
			Perform experiments by Interfacing I/O devices, sensors to Raspberry Pi/Arduino.
			Understand and analyze communication protocols in IoT.
			Monitor data and controlling of devices.
			Develop Real time IoT based projects.
83.	20CSE17	Enterprise Application Development Lab	Prepare database connections with application servers.
			Design user interfaces using ReactJS.
			Construct strong expertise on Express framework to develop responsive web applications.
			Create server side applications using Node.js
			Develop SPA using Angular 2.
			Invent next culture-shifting web applications.
84.	20CSE18	Machine Learning Lab	Identify the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.
			Identify and utilize modern tools that are useful for data analysis.
			Recognize and implement various ways of selecting suitable model parameters for different machine learning techniques.
			Implement and evaluate various Machine Learning approaches on real world problems
			Apply Keras and Tensorflow to implement ML techniques.
85.	20CSE19	Devops Lab	Understand the phases of the software development life

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			cycle.
			Examine the different version control systems.
			Recognize the importance of the build and deployment tools and test the software application.
			Deployment of application in production environment.
			Summaries the software configuration management.
			Synchronize and provisioning using Puppet and Ansible.
86.	20EGCO3	Employability Skill	Become effective communicators, participate in group discussions with confidence and be able to make presentations in a professional context.
			Write resumes, prepare and face interviews confidently.
			Be assertive and set short term and long term goals, learn to manage time effectively and deal with stress.
			Make the transition smoothly from campus to work, use media with etiquette and understand the academic ethics.
			Enrich their vocabulary, frame accurate sentences and comprehend passages confidently.
87.	20CSC30	Cryptography and Network Security	Analyze and design classical encryption techniques and block ciphers.
			Analyze and design hash and MAC algorithms, and digital signatures.
			Design network application security schemes like PGP, S/MIME, IPSec, SSL, TLS, HTTPS, SSH, etc.
			Evaluate the authentication and hash algorithms.
			Create and configure simple firewall architectures.
			Understand digital sign in emails and files.
88.	20CSE21	Deep Learning	Understand various learning models.
			Design and develop various Neural Network Architectures.
			Understand approximate reasoning using Convolution Neural Networks.
			Analyze and design Deep learning algorithms in different applications.
			Ability to apply CNN and RNN techniques to solve different applications.
			Evaluate the Performance of different models of Deep learning networks.
89.	20CSE22	Big Data Analytics	Demonstrate knowledge of Big Data, Data Analytics, challenges and their solutions in Big Data.
			Discuss about Hadoop Framework and eco systems.
			Understand and work on NoSQL environment and MongoDB.
			Explain and Analyse the Big Data using Map-reduce programming in Both Hadoop and Spark framework.
			Demonstrate spark programming with Python/R programming languages.
			Explain and Analyse the data Analytics algorithms in Spark
90.	20CSE23	Mobile Application Development	Interpret and analyze android platform architecture and features to learn best practices in android programming.
			Design the User Interface for mobile applications.
			Apply Intents, Broadcast receivers and Internet services in android App.
			Develop database management system to retrieve and/or store data for mobile application.
			Evaluate and select appropriate android solutions to the

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			mobile computing platform.
			Build Flutter applications for complex problems.
91.	20CSE24	Blockchain Technology	Understand the significance of Blockchain technology and its associated components.
			Understand the need for consensus protocols in Blockchain.
			Experience the Ethereum and Hyperledger Fabric Platforms.
			Incorporate Blockchain in financial software Systems and supply chain environments.
			Devise the need for Blockchain in Government sectors.
			Understand the significance of blockchain security.
92.	20CAE09	Planning and Estimation Of Autonomous Systems	Identify different motion planning schemas under different environments.
			Define different states and have mathematical knowledge on drop-off and estimation algorithms.
			Analyze different planning and decision techniques.
			Appraise different methods to solve finite Markov decision problem.
			Distinguish different decision making techniques under uncertain environment.
			Apply different information gathering techniques and associate Human-robot interaction.
93.	20CSE25	Social Computing	Identify the significance of social networks, representation, ranking techniques and challenges.
			Understand a broad range of social networks concepts and theories.
			Ascertain the network analysis knowledge in a diversified aspect of society.
			Analyze social network links and web search.
			Differentiate between centralized and decentralized search models.
			Generate and communicate the analysis results and impact of social networks.
94.	20CSE26	Human Computer Interaction	Understand the structure of models and theories of human computer interaction.
			Understand the vision of a computer user.
			Understand the recognition and remembrance limitations of a computer user.
			Understand and analyze the mobile ecosystem and tools for mobile design.
			Design an interactive mobile interfaces for mobile applications and widgets.
			Design an interactive web interface for web applications.
95.	20CAE10	Computational Neuroscience	Understand the fundamentals of computational neuroscience.
			Analyse the Neural Encoding Models.
			Make use of Neurons & Neural coding to extract information.
			Analyse the Computing in Carbon and Computing with Networks.
			Analyse the various learning methodologies.
			Evaluate the Performance of different neurological models.
96.	20CSE27	Distributed Systems	Understand the basic elements and concepts related to distributed systems.
			Illustrate the middleware technologies such as RPC, RMI

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			and Object based middleware that support distributed applications.
			Analyze the various techniques used for clock synchronization and mutual exclusion.
			Demonstrate the concepts of resource and process management and synchronization algorithms, consistency and replication management.
			Apply the knowledge of distributed file system for analysing various file systems like NFS, AFS and the experience in building large-scale distributed applications.
97.	20CSE28	Software Project Management	Apply suitable CMM for specific scenarios and determine the effectiveness.
			Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
			Compare and differentiate organization and project structures.
			Implement a project to manage project schedule, expenses and resource with the application of suitable project management tools.
			Identify and analyze SPM practices.
98.	20CSE29	Design Patterns	Apply formal notations of C++ and develop patterns of user choice to accomplish user interface design.
			Interpret document structure, formatting, look and feel standards and Multiple Window Systems to design document editor for a case study.
			Demonstrate abstract factory to design and develop catalog pattern and Adapter, Bridge, Composite, Decorator of Structural Patterns.
			Outline Façade, Flyweight, Proxy of behavioral patterns.
			Discuss the Iterator, Mediator, Observer, State, Strategy, Template Method, Visitor of Behavioral Patterns-2 and its consequences.
			State, Strategy, Template Method, Visitor of Behavioral Patterns-3 and its consequences.
99.	20PYO01	History Of Science and Technology	Demonstrate the process of beginning of science and civilization, knowledge acquisition and philosophical approach of science and its advancements in the Stone Ages and Antiquity period.
			Illustrate the advancements in science and technology in the medieval period across Asia and Arab countries and decline and revival of science in Europe.
			Explain the scientific approach and its advances of the Europeans and how the role of engineer during the industrial revolution and the major advancements.
			Make use of the advancements in the field of science and technology by adopting new philosophies of 19^{th} and first half of 20^{th} century in finding ethical solutions to the societal problems.
			Interpret the changes in specializations of science and the technology and build the relation between information and society from second half of 20^{th} century onwards.
100.	20MEO03	Research Methodologies	Define research problem.
			Review and assess the quality of literature from various sources.

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	Code	Name	
			Understand and develp various sresearch designs.
			Analyze problem by sttistical techniques: ANOVA, F-test, Chi-square.
			Improve the style and ormat of writing a report for technical paper/Journal report.
101.	20MEO04	Entrepreneurship	Understand the concept and essence of entrepreneurship.
			Identify business opportunities and nature of enterprise.
			Analyze the feasibility of new business plan.
			Apply project management techniques like PERT and CPM for effective planning and execution of projects.
			Use behavioral, leadership and time management aspects in entrepreneurial journey.
102.	20ECO05	Systems Automation and Control	Understand the features of various automatic and process control systems.
			Define and analyze various measuring parameters in the industry.
			Compare performance of various controllers (P, PD, PI, and PID).
			Illustrate the role of digital computers in automation.
			Develop various robot structures for different applications.
103.	20EEO03	Energy Auditing	Know the current energy scenario and various energy sources.
			Understand the concepts of energy auditing.
			Evaluate the performance of existing engineering systems.
			Explore the methods of improving energy efficiency in different engineering systems
			Design different energy efficient appliances.
104.	20EGM01	Indian Constitution and Fundamental Principles	Understand the making of the Indian Constitution and its features.
			Identify the difference among Right To equality, Right To freedom and Right to Liberty.
			Analyze the structuring of the Indian Union and differentiate the powers between Union and States.
			Distinguish between the functioning of Lok Sabha and Rajya Sabha while appreciating the importance of Judiciary.
			Differentiate between the functions underlying Municipalities, Panchayats and Co-operative Societies.
105.	20CSC31	Cryptography and Network Security Lab	Identify basic security attacks and services
			Design symmetric and asymmetric key algorithms for cryptography
			Create and use of Authentication functions
			Identify and investigate network security threat
			Analyze and design network security protocols
106.	20CSE30	Deep Learning Lab	Implement various learning models.
			Design and develop various Neural Network Architectures.
			Analyze various Optimization and Regularizations techniques of deep learning.
			Analyze various pretrained models using Convolution Neural Networks.
			Ability to apply RNN techniques to solve different applications.
			Evaluate the Performance of different models of Deep learning networks.
107.	20CSE31	Big Data Analytics Lab	Understand Configuration of various big data Frame Works.

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			Apply various visualization techniques to explore data.
			Demonstrate data base operations using MongoDB.
			Process big data using Hadoop framework.
			Build and apply Map-Reduce & NoSQL Concepts.
			Perform data analysis with machine learning methods.
108.	20CSE32	Mobile Application Development Lab	Analyze all the components and their properties of various Emulators for selecting suitable emulator.
			Apply essential android programming concepts for developing efficient mobile app.
			Develop android applications related to various layouts.
			Design Flutter applications with rich user interactive interfaces.
			Develop android applications related to mobile related server-less database like SQLite.
			Extend event handling to develop various mobile applications.
109.	20CSE33	Blockchain Technology Lab	Understand the fundamental primitives of Blockchain and consensus protocols.
			Explore various blockchain platforms such as ethereum, fabric.
			Identify the significance and working of Ethereum Platform.
			Work with the smart contracts.
			Implement the blockchain applications with Hyperledger Fabric.S
			Apply blockchain in different application domains such as financial and supply chain sectors.
110.	20CAE14	Planning and Estimation Of Autonomous Systems Lab	Identify different motion planning schemas under different environments.
			Implement different planning and decision techniques.
			Appraise and implement methods to solve finite Markov decision problem under uncertain situation.
			Understand different decision making techniques under uncertain environment.
			Programming different autonomous system and interaction with environment.
			Identify and explore autonomous system in real-life situations.
111.	20CSC32	Technical Seminar	Study and review research papers of new field/areas and summarize them.
			Identify promising new directions of various cutting edge technologies in Computer Science and Engineering
			Impart skills to prepare detailed report describing the selected topic/area.
			Acquire skills to write technical papers/articles for publication.
			Effectively communicate by making an oral presentation before the evaluating committee.
112.	20CSC33	Project Part - 1	Review the literature related to the problem area / selected topic.
			Undertake problem identification, formulation and solution.
			Prepare synopsis of the selected topic.
			Gather the required data and Set up the environment for the implementation.
			Conduct preliminary analysis/modelling/simulation

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			experiment.
			Communicate the work effectively in both oral and written forms.
113.	20CSI03	Internship - III	
114.			
115.	20CAE05	Multi Agent Intelligent Systems	Understand various aspects of multi agent systems and architecture of intelligent agents.
			Understand of various types of reasoning Agents.
			Acquire knowledge of multi agent systems communication and cooperation methods.
			Classify various types of decision making processes for multi agent systems.
			Use appropriate framework for agent communication and information sharing processes.
			Explore different kinds of Auctions for multi agent environment and applications.
116.	20CSE34	Cloud Computing	Understand the need of cloud technology and terminology.
			Identify and understand the cloud infrastructure.
			Write scripts for the automation of infrastructure and software deployment.
			Design solutions for the automation and migration of manual data centers.
			Develop scripts for the automation of cloud services.
117.	20CSE35	Augmented Reality And Virtual Reality	Explain how the humans interact with computers.
			Understand the design and implementation of the technologies for AR and VR systems.
			Apply technical and creative approaches to make successful applications and experiences.
			Design audio and video interaction paradigms.
			Understand AR and VR best practices.
			Apply VR/MR/AR in various fields in industry.
118.	20CSE36	Cyber Security	List the different types of cybercrimes and analyze legal frameworks to handle cybercrimes.
			Discuss the cyber offence and vulnerabilities in programming languages.
			Identify the Tools and Methods used in cybercrimes.
			Analyze and resolve cyber security issues and laws governing Cyberspace.
			Describe the need of Digital Forensics and the importance of digital evidence in prosecution.
			Interpret the commercial activities in the event of significant information security incidents in the Organization.
119.	20CSE37	High Performance Computing	Understand different parallel computing architectures and networks.

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			Ability to design parallel algorithms and measure their performance.
			Understand vector processing, memory bottlenecks, data and thread-level parallelism.
			Understand the various programming frameworks like MPI, OpenMP and CUDA.
			Understand cache coherence protocols and read-write semantics of parallel programs.
			Gain knowledge of writing efficient parallel programs.
120.	20EGMO4	Gender Sensitization	Understand the difference between "Sex" and "Gender" and be able to explain socially constructed theories of identity.
			Recognize shifting definitions of "Man" and "Women" in relation to evolving notions of "Masculinity" and "Femininity".
			Appreciate women's contributions to society historically, culturally and politically.
			Analyze the contemporary system of privilege and oppressions, with special attention to the ways gender intersects with race, class, sexuality, ethnicity, ability, religion, and nationality.
			Demonstrate an understanding of personal life, the workplace, the community and active civic engagement through classroom learning.
121.	20CEM01	Environmental Science	Identify the natural resources and realise the importance of water, food, forest, mineral, energy, land resources and affects of over utilisation.
			Understand the concept of ecosystems and realise the importance of interlinking of food chains.
			Contribute for the conservation of bio-diversity.
			Suggest suitable remedial measure for the problems of environmental pollution and contribute for the framing of legislation for protection of environment.
			Follow the environmental ethics and contribute to the mitigation and management of environmental disasters.
122.	20CSC39	Project Part - 2	Demonstrate a sound technical knowledge of their selected topic.
			Design engineering solutions to complex problems utilizing a systematic approach.
			Conduct investigations by using research-based knowledge and methods to provide valid conclusions.
			Create/select/use modern tools for the modelling, prediction and understanding the limitation of complex engineering solutions.
			Communicate with engineers and the community at large in written and oral forms.
			Demonstrate the knowledge, skills and attitudes of a professional engineer.
123.	20CSO01	Fundamentals Of Virtual Reality	Define Virtual Reality and describe the components of a VR system, input and output devices of virtual reality systems.
			Apply geometric modeling to model real world scenarios.
			Develop interfaces by using visual physiology, visual perception and audio.
			Evaluate virtual reality systems for usability.
			Explore the applications of VR systems in defense and telerobotics.

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124.	20CSO02	Introduction To Web Technology	Understand the technologies required for developing web application.
			Identify and choose XHTML tags, CSS and java scripts to develop well-structured and easily maintained web pages.
			Design and Develop interactive and innovative web pages using various platforms/technologies like XHTML, CSS, XML, JAVASCRIPT.
			Create and deploy web applications in web server by using server-side programming concepts like PHP
			Build a data driven web site using Databases.
			Evaluate different web applications to implement optimal solutions for real time problems.
125.	20CSO03	Introduction To Soft Computing	Illustrates various soft computing techniques.
			Analyze and design various learning models.
			Apply the Neural Network Architecture for various Real time applications.
			Apply approximate reasoning using fuzzy logic.
			Analyze and design Genetic algorithms in different applications.
			Apply soft computing techniques to solve different applications.
126.	20CSO04	Open Source Technologies	Differentiate between Open Source and Proprietary software and Licensing.
			Identify the applications, benefits and features of Open Source Technologies.
			Evaluate open source project and management tools like Linux, Apache, and GIT.
			Adapt to the usage of Open source tools and technologies.
			Analyze the Social and Financial impact of Open source technology on Governance, Teaching and Business
			Practice Open Source principles, ethics and models.
127.	20CSO05	Basics Of Artificial Intelligence	Differentiate between a rudimentary Problem and an AI problem, its Characteristics and problem-solving Techniques.
			Compare and contrast the various knowledge representation schemes of AI.
			Appraise knowledge in Uncertainty and Probabilistic reasoning approaches.
			Understand the different learning techniques.
			Apply the AI techniques to solve the real-world problems.
128.	20CSO06	Fundamentals Of Blockchain Technology	Understand the concepts of distributed systems and Blockchain properties.
			Learn about the significance of bitcoin ecosystem.
			Understand consensus mechanisms and technologies that support ethereum.
			Learn about Hyperledger Fabric and its architecture.
			Analyze blockchain use cases in financial software systems and government sectors.
129.	20CSO07	Fundamentals Of Software Engineering	State the software process and the perspective process models and agile process models.
			Interpret the Requirements of Software Product and demonstrate the skills necessary to specify the requirements of software product.
			Recall the software architecture and design principles of

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	Code	Name	
			software product.
			Construct a product using coding principles and Outline the testing strategies for conventional and O-O Software.
			Apply software testing methods like White Box, Black box and explore the corrective, adaptive, and enhancive software maintenance categories.
130.	20CSO08	Basics Of Machine Learning	Define the basic concepts related to Python and Machine Learning
			Describe the feature engineering methods, regression techniques and classification methods
			Apply Python packages for data visualization, text and time series data analysis using NLP toolkit
			Evaluate and interpret the results of the various machine learning techniques
			Solve real world problems using deep learning framework.
131.	20CSO09	Fundamentals Of Database Management Systems	Classify the difference between FMS and DBMS; describe the roles of different users and the structure of the DBMS. Design the database logically using ER modeling
			Outline the schema of the relational database and key constraints. Develop queries using DDL, DML and DCL of SQL.
			Identify the inference rules for functional dependencies and apply the principles of normal forms to decompose the relations in a database.
			Summarize the concepts of dense, sparse, ISAM and B+ tree indexing and get familiar with states and properties of transactions.
			Interpret the locking, time stamp, graph and validation-based protocols for concurrency control.
			Summarize log-based recovery techniques to increase the robustness of the database, identify to resolve the deadlocks in the transactions.
132.	20CSO10	Basics Of Cyber Security	Analyze and evaluate the cyber security needs of an organization.
			Determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation.
			Measure the performance and troubleshoot cyber security systems.
			Implement cyber security solutions and use of cyber security, information assurance, and cyber/computer forensics software/tools.
			Applying operational and cyber security strategies and policies.
133.	20CSO11	Data Visualization Models	Illustrate the modeling of various types of data.
			Understand the visualization fundamentals.
			Apply methods and tools for Non – spatial Data Visualization.
			Apply methods for spatial data visualization.
			Apply methods for web data visualization.
134.	20CSO12	Introduction To Mobile Application Development	Interpret and analyze android platform architecture and features to learn best practices in android programming.
			Design the User Interface for mobile applications.
			Apply Intents, broadcast receivers and Internet services in android app.

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SNo	Course		Course Outcomes Statements
	Code	Name	
			Develop database management system to retrieve and/or store data for mobile application.
			Evaluate and select appropriate android solutions to the mobile computing platform.
			Build android applications for complex problems.
135.	20CSO13	Basics Of Cloud Computing	Define the main concepts, key technologies, strengths, and limitations of cloud computing.
			Develop the ability to understand and use compute and storage cloud architecture, service, and delivery models.
			Understanding the virtualization and enabling technologies that help develop the cloud.
			Explain the core issues of cloud computing such as resource management and security.
			Evaluate and choose the appropriate technologies, and approaches for implementing and using the cloud.
136.	20CSO14	Fundamentals Of Computer Vision	Recognize the basic fundamentals of vision and describe the scope of challenges.
			Develop algorithms to analyze feature detection and feature alignment.
			Analyze images and videos for problems such as tracking and structure from motion.
			Choose object, scene recognition and categorization algorithms for real time images.
			Apply various techniques to build computer vision applications.

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Course Outcomes Statements for R18

SNo	Course		Course Outcomes Statements
	Code	Name	
1.	18MT C01	Mathematics -I	Solve system of linear equations and identify the Eigen values and Eigen vectors in engineeringproblems.
			Check the series convergence.
			Find the evolutes of the given curves.
			Expand and find extreme values of functions of two variables.
			Understanding the significance of gradient, divergence and curl.
			An ability to solve the problems and interpret in geometrical approach.
2.	18CY C01	Chemistry	Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
			Rationalize bulk properties and processes using thermodynamic considerations & Ionic Equilibria.
			List major chemical reactions that are used in the synthesis of molecules.
			Apply the various methods used in treatment of water for domestic and industrial use.
			Discuss the various Engineering materials & Drug synthesis & their applications.
3.	18CEC01N	Engineering Mechanics	Solve problems dealing with forces in plane systems, draw free body diagrams and analyse problems using equilibrium equations for a smooth surface.
			Solve problems involving force system with frictional resistance and to analyse simple trusses for forces in various members of a truss.
			Determine centroid and area moment of inertia for elementary and composite figures.
			Solve problems in kinematics and kinetics of a particle and connected systems.
			Solve problems for body motion using work energy principle and impulse-momentum approach for translatory motion bodies.
4.	18CS C01	Programming for Problem Solving	Identify the computing environments.
			Formulate solutions to problems and represent them using algorithms/ Flowcharts.
			Choose proper control statements and data structures to implement the algorithms.
			Decompose a problem into modules and use functions to implement the modules.
			Develop applications using file I/O.
5.	18MEC01N	Engineering Graphics and Design	Exposure to graphics package.
			Exposure to the visual aspects of engineering design.
			To become familiar with engineering graphics standards.
			Exposure to orthographic projections.
			Exposure to engineering communication.
6.	18CS C02	Programming For Problem Solving Lab	Identify and setup program development environment.
			Implement the algorithms using C programming language constructs.
			Identify and rectify the syntax errors and debug program for semantic errors.
			Solve problems in a modular approach using functions.
			Implement file operations with simple text data.

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SNo	Course		Course Outcomes Statements
	Code	Name	
7.	18CY CO2	Chemistry Lab	Identify the basic chemical analysis methods to calculate the substances quantitatively.
			Determine the rate constants of reactions from concentration of reactants/ products as a function of time
			Calculate the concentration and amount of various substances using instrumental techniques.
			Develop the basic drug molecule and Identify the organic compounds
			Analyse the molecular properties such as surface tension and viscosity
8.	18MT C03	Mathematics -II	Find the areas, volumes and surface of solids revolution.
			Use Greens, Gauss and Stoke's theorems to find the surface and volume integrals.
			Able to solve solutions of differential equations with initial and boundary value problems.
			Solve the problems on analytic functions, Cauchy's theorem and Cauchy's integral formula.
			Real and complex integrals by using Cauchy's theorems.
			Solve physical and engineering problems.
9.	18PY C01	Optics and Semiconductor Physics	Demonstrate the wave nature of the light.
			Describe the types of lasers and their applications.
			Explain the importance of wave mechanics.
			Demonstrate the importance of band theory of solids.
			Identify the semiconductors for engineering applications.
10.	18CS C03	Object-Oriented Programming	Understand the concepts Object-Oriented Programming Languages.
			Adequately use the constructs such as selection, repetition, functions and aggregated data .
			Develop applications in modular approach with classes/modules
			Develop solutions to the problems using exception handling.
			Build packages for simple real world problems and use libraries/packages for graphics and plotting.
11.	18EG C01	English	The students will understand the nature, process and types of communication and will communicate effectively without barriers.
			The students will write correct sentences and coherent paragraphs.
			The students will know how to condense passages by writing précis and write essays by using accurate grammar and appropriate vocabulary.
			The students will demonstrate advanced writing skills by drafting formal reports.
			The students will apply their reading techniques and analyze reading comprehension passages.
12.	18PY C02	Optics and Semiconductor Physics Laboratory	Understand the concept of errors and find the ways to minimize the errors.
			Demonstrate interference and diffraction phenomena experimentally.
			Understand the applications of semiconductor materials.
			Know the working of optoelectronic devices.
			Use LCR circuits in different applications.
13.	18CS C04	Object-Oriented Programming Lab	Set up programming environment to work with Python.
			Chose appropriate control constructs, data structures to implement the solutions. Design and develop solutions in to the modular approach using OOPs concepts.
			Debug programs to verify and validate one code.
			Use of STLs and modules for graphics and plotting.

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SNo	Course		Course Outcomes Statements
	Code	Name	
			Design and develop solutions to the problems in modular approach using OOPs concepts.
14.	18ME C02	Workshop/ Manufacturing Practice	Fabricate components with their own hands.
			Get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
			Assembling different components, student will be able to produce small mechanisms/devices of their interest.
			Gain practical skills of carpentry, tinsmithy, fitting, house wiring.
			Gain knowledge of different Engineering Materials and Manufacturing Methods and Understand trades and techniques used in Workshop and chooses the best material/ manufacturing process for the application
15.	18EG C02	English Lab	Differentiate the speech sounds in English.
			Interact with the software and understand the nuances of pronunciation in English.
			Speak with the proper tone, intonation and rhythm and apply stress correctly. The students will demonstrate their listening skills by analyzing the IELTS and TOEFL listening comprehension texts.
			Speak with clarity and confidence.
			Work in teams and discuss various topics and demonstrate their presentation skills through posters.
16.	18EEC01	Basic Electrical Engineering	Acquire the concepts of Kirchhoff's laws and network theorems and able to get the solution of simple dc circuits Obtain the steady state response of RLC circuits and also determine the different powers in AC circuits
			Acquire the concepts of principle of operation of Transformers and DC machines
			Acquire the concepts of principle of operation of DC machines and AC machines
			Acquire the knowledge of electrical wiring and cables and electrical safety precautions
			Recognize importance of earthing and methods of earthing and electrical installations
17.	18CSC07	Data Structures	Understand the basic concepts of data structures.
			Analyze the performance of algorithms.
			Distinguish between linear and non-linear data structures.
			Identify the significance of balanced search trees.
			Establish a suitable data structure for real world applications.
18.	18CSC08	Discrete Mathematics	Apply Propositional and Predicate logic for problem solving in various domains.
			Understand Set Theory, Relations, Functions and Lattices as partially ordered sets.
			Model and solve the real world problems using Generating Functions and Recurrence Relations.
			Understand and apply the principles of graphs and trees to simple applications.
			Study Algebraic systems and their general Properties.
19.	18CSC09	Digital Electronics and Logic Design	Familiarize with number systems, simplification of Boolean functions.
			Manipulate simple Boolean expressions using maps and tabulation method.
			Design basic digital circuits in Computer Hardware and Digital system.

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SNo	Course		Course Outcomes Statements
	Code	Name	
			Use high level HDLs such as Verilog for the design of Combinational and Sequential circuits.
			Configure registers and counters for different applications.
20.	18MEC09	Principles of Management	Identify and evaluate the principles of management
			Demonstrate the ability to have an effective and realistic planning
			Identify the nature and the type of organization
			Apply the tools and techniques of directing
			Explain and evaluate the necessity for controlling and further refinement of an organization.
21.	18CEM01	Environmental Science	Define environment, identify the natural resources and ecosystems and contribute for the conservation of bio-diversity.
			Suggest suitable remedial measure for the problems of environmental pollution and contribute for the framing of legislation for protection of environment.
			Relate the social issues and the environment and contribute for the sustainable development.
			Follow the environmental ethics.
			Contribute for the mitigation and management of environmental disasters
22.	18EEC02	Basic Electrical Engineering Lab	Make electrical connections by wires of appropriate ratings.
			Understand the circuit analysis techniques.
			Determine the parameters of the given coil.
			Understand the basic characteristics of transformer.
			Understand the basic characteristics of dc and ac machines.
23.	18CSC10	Data Structures Lab	Implement the abstract data type.
			Implement linear data structures such as stacks, queues using array and linked list.
			Implement non-linear data structures such as trees, graphs.
			Analyze various searching and sorting techniques.
			Design and develop real world problem using suitable data structures.
24.	18CSC11	Digital Electronics and Logic Design Lab	Design a Digital circuit using Verilog HDL.
			Understand various abstraction levels of a digital design.
			Verify the functionality of a design using Test bench.
			Simulate and synthesize combinational logic circuits.
			Simulate and synthesize sequential logic circuits.
25.	18EGC03	Soft Skills	Be effective communicators and participate in group discussions and case studies with confidence. Also be able to make presentations in a professional context.
26.			Write Resumes, prepare and face interviews confidently.
27.			Be assertive and set short term and long term goals. Also learn to manage time effectively and deal with stress.
28.			Make the transition smoothly from Campus to Corporate. Also use media with etiquette and know what academic ethics are.
29.			To do a live, mini project by collecting and analyzing data and making oral and written presentation of the same.
30.	18ECC34	Basic Electronics	Use semiconductor devices in making circuits like rectifiers, filters, regulators etc.
			Design amplifier and oscillators
			Compare various types of power amplifiers.
			Analyze the principles and practices for instrument design to development the real world Problems.
			Apply concepts of various electronic circuits.

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SNo	Course		Course Outcomes Statements
	Code	Name	
31.	18MTC09	Probability and Statistics	Use the principle of Least Squares approximating for estimating the value.
			Use the basic probability for fitting the Random phenomenon.
			Analyzing data using different methods of hypothesis testing.
			Use the Moving Averages Methods for trend analysis.
			Analyze the random phenomena of real world data.
32.	18CSC12	Computer Architecture and Micro Processor	Understand the functional block diagram of single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.
			Design assembly language program for specified computing 16 bit multiplication, division and I/O device interface.
			Derive flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process.
			Design a memory module and analyze its operation by interfacing with the CPU.
			Apply design techniques to enhance performance using pipelining, parallelism and RISC methodology.
33.	18CSC13	Data Base Management Systems	Classify the difference between FMS and DBMS; describe the roles of different users and the structure of the DBMS.
			Design the database using ER modeling and Write queries using DDL, DML and DCL of SQL, Relational Algebra and Procedures, Functions using PL/SQL
			Outline the inference rules for functional dependencies and apply the principles of normal forms to decompose the relations in a database.
			Summarize basic concepts of storage techniques like indexing, hashing and familiar with states and properties of transaction.
			Illustrate locking, time stamp, graph and validation-based protocols for concurrency control.
			Relate log based, ARIES recovery techniques to increase the robustness of the database, identify to resolve the deadlocks in the transaction.
34.	18EGM01	Indian Constitution and Fundamental Principles	Understand the making of the Indian Constitution, its features and know the importance of Directive Principles of State Policy.
			Identify the difference between Right to Equality and Right to Freedom and acquires the legal status of Fundamental Duties.
			Analyze the structuring of the Indian Union, distribution of powers between the Union and the States, and the role and position of President in Union Government.
			Distinguish between the Lok Sabha and Rajya Sabha in law making while appreciating the importance of Judiciary in interpretation of law.
			Differentiate between the Municipalities and Panchayats in their structure and functions.
			Apply the knowledge of Indian Constitution to real-life or professional situation for better civic society
35.	18ECC35	Basic Electronics Lab	Familiarize on basic electronic components, devices and system.
			Analyze the measurements of time period, amplitude and phase of different waveforms.
			Design and analyze the behavior of the regulator and rectifier.
			Develop various types of oscillators and power amplifiers
			Design the various circuits using operational amplifiers.
36.	18CSC14	Computer	Describe the architecture and comprehend the instruction set of

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SNo	Course		Course Outcomes Statements
	Code	Name	
		Architecture and Micro Processor Lab	8086.
			Understand and apply the principles of Assembly Language Programming in developing microprocessor based applications.
			Get familiarized with different assembly language software tools.
			Work with standard microprocessor interfaces to know how a processor will communicate with the External world.
			Design and develop of various Embedded Applications.
37.	18CSC15	Data Base Management Systems Lab	Apply the built-in functions and write simple queries on various databases.
			Perform definition and manipulation of data using SQL commands.
			Develop complex queries using joins and nested queries.
			Add constraints on Databases implement DCL, TCL and advanced SQL commands.
			Develop programs using cursors, triggers, exceptions, procedures and functions in PL/SQL.
38.	18CSC16	IT Workshop (Latex/Scilab)	Understand the need of documentation tools.
			Install the documentation tools.
			Generate templates for generation report using Latex.
			Generate templates for presentation using Beamer.
			Explore the utilities of Scilab
39.	18CSC17	Formal Language and Automata Theory	Describe language basics like Alphabet, strings, grammars, productions, derivations, and Chomsky hierarchy.
			Recognize regular expressions, formulate, and build equivalent finite automata for various languages.
			Identify closure, decision properties of the languages and prove the membership.
			Demonstrate context-free grammars, check the ambiguity of the grammars and design equivalent PDA to accept.
			Use mathematical tools and abstract machine models to solve complex problems.
			Distinguish between decidability and undecidability.
40.	18CSC18	Operating System	Define the fundamental components of a computer operating system and the interactions among them
			Illustrate CPU scheduling algorithms, memory management techniques and deadlock handling methods
			Build applications using semaphores and monitors to synchronize their operations
			Analyse the performance of CPU scheduling and page replacement algorithms
			Evaluate the structure of GNU/Linux and Android
41.	18CSC19	Design and Analysis of Algorithms	List the performance metrics and design strategies of algorithms.
			Describe the algorithmic design techniques of divide and conquer, greedy, dynamic programming, backtracking and branch and bound to solve problems.
			Apply suitable algorithmic design techniques to solve problems.
			Analyze the performance of a given algorithm.
			Evaluate various algorithmic design techniques.
			Formulate solutions to NP problem.
42.	18CSE01	Web and Internet Technologies	Develop static web sites using XHTML and Java Scripts.
			Understand the role of XML and Java Script in web applications.
			Write programs in java using all of its object oriented concepts.
			Differentiate between Servlets and JSPs and use them according to the demands of the situation in developing dynamic web content.

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SNo	Course		Course Outcomes Statements
	Code	Name	
			Use JDBC to access a remote database in a web application.
43.	18CSE02	GUI Programming	Understand GUI frameworks / tool required for GUI programming.
			Explore the features of PyQt for the develop GUI applications.
			Customize GUIs by using layout managers and look-and-feel features.
			Develop beautiful charts using the free Matplotlib Python module.
			Design and develop UIs using threading in a networked environment to make the GUIs responsive and compatible with Android, iOS.
44.	18CSE03	Image Processing	Explain the basic principles of image processing and its significance in real world.
			Interpret various types of images and applies image transformations.
			Evaluate various approaches for image segmentation and image restoration.
			Define image processing methods and recognize morphological image processing techniques.
			Recognize image compression and comprehend image compression techniques in both domains.
			Apply image processing algorithms for real world problems.
45.	18CSE04	Mobile Application Development	Interpret and Analyze Android platform architecture and features to learn best practices in Android programming.
			Design the User Interface for Mobile applications.
			Apply Intents, Broadcast receivers and Internet services in Android App.
			Develop database management system to retrieve and/or store data for Mobile application.
			Evaluate and select appropriate Android solutions to the Mobile computing platform.
			Build Android applications for complex problems.
46.	18MTO 01	Decision Theory	Calculate the optimum values for given objective function by LPP
			Solve the solution for maximise the profit with minimum cost by Transportation problem.
			Determine the optimum feasible solution for sequencing the Jobs
			Arrange the jobs for different Machines to get optimum values
			Measure the solution of dynamical system problems
47.	18MTO 02	Graph Theory	Identify the concepts of the Graph Theory in related problems.
			Determine the solutions in Matching and Covers, Maximum Matching in Bipartite Graph.
			Calculate the solutions for Matching and Faster Bipartite Matching, Matching in general graphs and related Algorithms.
			Apply the Knowledge of Job sequencing, One-Way Traffic, Rankings to solve real time problems.
			Solve combinatorial optimization problems pertaining to Network flow.
48.	18MTO 03	Number Theory and Cryptography	Count different operations of basic number theory.
			Distinguish between public Key and related algorithms.
			Define algebraic theorems with respect to well-known algorithms.
			Apply the Euler's φ function and related algorithms in RSA crypto system.
			Appraise security issues on elliptic curve cryptography.
49.	18MTO 04	Quantum Computing	Identify the working of a Quantum Computing Program, its architecture and program model.

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SNo	Course		Course Outcomes Statements
	Code	Name	
			Compute basic mathematical operations.
			Demonstrate quantum logic gate circuits.
			Develop quantum algorithm.
			Appraise quantum algorithm on major toolkits.
50.	18CSC20	Operating System Lab	Able to use and develop shell scripts for process management
			Demonstrate CPU scheduling and page replacement algorithms
			Demonstrate GNU/Linux interprocess communication mechanisms and deadlock detection using Banker's algorithm
			Evaluate CPU scheduling and page replacement algorithms
			Design and create system calls
51.	18CSC21	Design and Analysis of Algorithms Lab	Identify and setup environment for the implementation of algorithms.
			Implement divide and conquer, greedy, dynamic programming, backtracking and branch and bound techniques.
			Demonstrate various algorithmic design techniques.
			Analyze the performance of various algorithms.
			Compare various design strategies.
			Formulate solutions to solve real world problems use acquired knowledge.
52.	18CSE05	Web and Internet Technologies Lab	Students will be able to develop static web sites using XHTML and CSS
			Validate form data and create dynamic content using javascript
			Develop Dynamic web content using Java Servlets and JSP
			Handle Sessions and use servlet filters in web applications.
			Validate form data and create dynamic content using javascript
53.	18CSE06	GUI Programming Lab	Install and explore the features of selected IDE and frameworks.
			Create widgets, buttons, tools and customize them using layout management tools.
			Design user interfaces for the selected problem.
			Implement the designed UI using PyQt and Dt Designer.
			Customize UIs by using threading and make them responsive that are compatible with Android and iOS.
54.	18CSE07	Image Processing Lab	Identify the fundamental issues and challenges of image processing.
			Translate images from spatial to frequency domain by applying various transformations.
			Perform point operations and filtering in both domains.
			Apply various techniques to enhance and analyze the image in detail.
			Interpret various compression techniques and edge detection methods.
			Evaluate Image processing algorithms for real-world problems.
55.	18CSE08	Mobile Application Development Lab	Analyze all the components and their properties of various Emulators to select appropriate Emulator for Android App.
			Apply essential Android programming concepts for developing efficient Mobile App.
			Develop Android applications related to various Layouts.
			Design applications with rich User interactive Interfaces.
			Develop Android applications related to Mobile related server -less database like SQLite.
			Extend Event Handling to develop various Mobile applications.
56.	18CSC22	Mini Project	Identify and understand the real world problems.
			Formulate the solutions to the problems by applying Computer

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SNo	Course		Course Outcomes Statements
	Code	Name	
			Science and Mathematical fundamentals.
			Represent the solutions by using various design aids/charts/diagrams.
			Implement the solutions using modern tools/languages.
			Analyze and interpret the experimentation results, draw conclusions
			Communicate effectively through technical reports and presentation according to the documentation / report guidelines and presentation according to the documentation/report guidelines
57.	18CSC23	Data Communication and Computer Networks	Define the communication protocol suites like ISO-OSI and TCP/IP.
			Illustrate and explain Data Communications System and its components.
			Identify and analyze various routing algorithms, congestion control algorithms.
			Distinguish the internet protocols like IP, ARP, ICMP, IGMP, BGP, OSPF, and DHCP.
			Outline the transport layer protocols like TCP, UDP, RTCP.
			List and examine the applications of HTTP, WWW, DNS, Email, FTP and the underlying protocols.
58.	18CSC24	Software Engineering	State the software process and the perspective process model, evolutionary and agile process models.
			Interpret the Requirements of Software Product and Estimate the cost of software using empirical models.
			Demonstrate the skills necessary to specify the requirements of software product.
			Recall the design principles and construct a product using coding principles and standards.
			Prepare test cases and Apply software testing methods like White Box, Black box, and O-O.
			Identify the configuration Management and estimates software quality and metrics of maintenance.
59.	18CSC25	Artificial Intelligence	Explain the role of agents and interaction with the environment to establish goals.
			Identify and formulate search strategies to solve problems by applying suitable search strategy.
			Compare and contrast the various knowledge representation schemes of AI.
			Appraise probabilistic reasoning and Markov decision process to solve real world problems.
			Apply the AI concepts to build an expert system to solve the real-world problems.
			Describe learning paradigms in machine learning.
60.	18CSE09	Internet of Things	Identify hardware and software components of Internet of Things.
			Interface Input-Output devices, sensors with Arduino and Raspberry Pi using communication modules.
			Analyze the use of communication protocols in IoT.

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SNo	Course		Course Outcomes Statements
	Code	Name	
			Remotely monitor data and subsequently control various devices.
			Develop real time IoT based projects.
			Applications of IoT in various domains such as health care, industrial automation.
61.	18CSE10	Parallel and Distributed Algorithms	Describe the models and techniques for parallelization.
			Make use of list ranking and graph coloring parallel Algorithms.
			Analyze parallel algorithms and compute their complexity measures.
			Develop parallel programs for search and matrix multiplication using open MP.
			Choose a parallel algorithm that makes good use of the target Architecture.
			Describe the distributed Algorithms to learn its models and complexity measures.
62.	18CSE11	Cloud Computing	Define Cloud Computing and related concepts and describe the characteristics, advantages, risks and challenges associated with cloud computing.
			Explain and characterize various cloud service models, cloud deployment models.
			Explore virtualization techniques that serve in offering software, computation and storage Services on the cloud.
			Illustrate the concepts of cloud storage and demonstrate their use in storage systems such as Amazon S3 and HDFS.
			Understand the security and privacy issues related to cloud computing environments.
			Investigate/Interpret the security and privacy issues related to cloud computing environments.
63.	18CSE12	Computer Vision	Recognize the basic fundamentals of vision and describe the scope of challenges.
			Develop algorithms to analyze feature detection and feature alignment.
			Analyze images and videos for problems such as tracking and structure from motion.
			Choose object, scene recognition and categorization algorithms for real time images.
			Explain recovery of 3D structure of ill-posed scenes.
			Apply various techniques to build computer vision applications.
64.	18CSE13	Soft Computing	Understand various soft computing techniques.
			Analyze and design various learning models and Neural Network Architectures.
			Apply the Neural Network Architecture for various Real time applications.
			Understand approximate reasoning using fuzzy logic.
			Analyze and design Genetic algorithms in different applications.
			Apply soft computing techniques to solve different applications.
65.	18CSE14	Network and System	Identify and define the the basic system administration and

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SNo	Course		Course Outcomes Statements
	Code	Name	
		Administration	networking tools
			Illustrate system boot process, administration tools
			Configure various services like mail, ftp, web hosting, security, use remote administration tools
			Analyze and interpret log messages for troubleshooting the issues
			Measure and evaluate the performance of system and network,
			Write scripts to automate system administration process
66.	18CSE15	Mobile Computing	Explain the basics of mobile telecommunication systems
			Illustrate the generations of telecommunication systems in wireless networks
			Determine the functionality of MAC, network layer and Identify a routing protocol for a given Ad hoc network
			Explain the functionality of Transport and Application layers
			Develop a mobile application using android/blackberry/ios/Windows SDK
67.	18CSE16	Free and Open-Source Software	Identify various FOSS tools, platforms, licensing procedures and development models, ethics
			Describe various FOSS projects, development models and project management
			Adapt to the usage of FOSS tools and technologies.
			Distinguish between Proprietary and Open Source tools, development methods
			Evaluate various Open Source projects like Linux, Apache, GIT
			Practice Open Source principles, ethics and models.
68.	18MBC 01	Engineering Economics and Accountancy	Apply fundamental knowledge of Managerial economics concepts and tools.
			Understand various aspects of demand analysis and forecasting
			Analyze production and cost relationships to make best use of resources available.
			Analyze different opportunities and come out with best feasible capital investment decisions
			Apply accountancy concepts and conventions and preparation of final accounts.
69.	18EEM 01	Indian Traditional Knowledge	Understand the culture, civilization, and heritage of Ancient, Medieval and Modern India.
			Distinguish various Languages and Literature existing in India
			Discuss and Compare Philosophy and Religion in Indian since ancient times
			Explore various Fine arts in Indian History, and Illustrate the development of Science and Technology in India.
			Describe the Indian Education System, and recognize the efforts of scientist to the development of India
70.	18CSC26	Data	Identify the different types of equipment like cables used in the

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SNo	Course		Course Outcomes Statements
	Code	Name	
		Communication and Computer Networks Lab	networks Lab.
			Recognize the various network devices like repeater, hub, switch.
			Practice the basic network commands like ifconfig, ping, traceroute, nslookup, dig, arp, netstat, nmap.
			Design and demonstrate network topologies using NS3 simulation tool.
			Examine the packet transfer using NetAnim.
			Analyze the network performance using Wire shark or any tool.
71.	18CSC27	Case Study	Understand real life situations, problems, developments of technologies in Computer science
			Interpret, analyse, and think critically about the events, situations and gather information from various sources for formulating solutions
			Apply learned knowledge and commit to decisions
			Evaluate the approach and solution to the event/problem by considering efficiency and optimization
			Communicate efficiently both in written and orally to discuss the recommendations
72.	18BTO01	Basics of Biology	Provides information about how mankind gained knowledge from olden days to modern days.
			Explain how the body parts working in the human system.
			Engineer the medical devices.
			Analyze the types of advanced treatments in the market.
			Remediate the toxic pollutants.
			Sequence the genome of different organisms.
73.	18CSC28	Compiler Design	Identify the concepts related to translator, tokens, bootstrapping porting and phases of the compiler.
			Use grammar specifications and implement lexical analyzer by the help of compiler tools.
			Explore the techniques of Top down, Bottom up Parsers and apply parsing methods for various grammars.
			Implement syntax directed translation schemes and relate Symbol table organization for Block structured and non-Block structured languages.
			Explain the algorithms to generate code for a target machine code and evaluate.
			Recognize the errors and apply the recovery strategies for the errors identified by the phases of a compiler.
74.	18CSE17	Data Science and Big Data Analytics	Describe Data Discovery, Data Preparation, Model Planning and Building, communicate results, operationalize phases of data analytics life cycle and Evaluation of data using statistical methods, ANOVA.
			Predict the approaches for grouping similar objects using Least Squares, Nearest Neighbors and identify frequent patterns using Apriori algorithm, FP-Growth.
			Examine Time Series Analysis using ARIMA and representation, processing and analysis of textual data to derive useful insights

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SNo	Course		Course Outcomes Statements
	Code	Name	
			using TFIDF.
			Recall Velocity, variety, volume, veracity of big data. Examples of big data and Risks, Crowd sourcing analytics of Big data technologies.
			Outline the Architecture of Apache Hadoop HDFS and Map Reduce operations to perform filtering, Job Tracking and restructuring data.
			Explain types, benefits of No SQL databases and identify applications of stream data model, query processing and optimization techniques.
75.	18CSE18	Machine Learning	Define the basic concepts related to Machine Learning.
			Recognize the underlying mathematical relationships within and across Machine Learning algorithms and their paradigms.
			Determine the various applications of Machine Learning.
			Model the problems using various machine learning techniques.
			Design and develop solutions to real world problems using Machine Learning Algorithms.
			Evaluate and interpret the results of the various machine learning technique
76.	18CSE19	Virtual Reality	List the virtual environment requirements and benefits of virtual reality
			Familiarize with various VR technologies and models of interactions in VR systems
			Simulate flight dynamics of an aircraft in virtual environment
			Identify the virtual hardware and software for modeling real world environments
			Develop Virtual Reality applications
			Explore the applications of VR in training, engineering, entertainment and science.
77.	18CSE20	Cyber Security	List the different types of cybercrimes and analyze legal frameworks to handle cybercrimes.
			Identify the Tools and Methods used in cybercrimes.
			Analyze and resolve cyber security issues and laws governing Cyberspace.
			Describe the need of Digital Forensics and the importance of digital evidence in prosecution.
			Interpret the commercial activities in the event of significant information security incidents in the Organization.
			Discuss the vulnerabilities in networking protocols and their mitigation techniques.
78.	18CSE21	Software defined Networks	Describe the evolution of modern data centers.
			Identify the components of Software Defined Networks and their use.
			Build Software Defined Network solutions for Data Center Network including VLANs, EVPN, VxLAN and NVGRE.
			Explore the features of Juniper SDN frame work.
			Evaluate Open SDN API and Hypervisor based overlays.

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SNo	Course		Course Outcomes Statements
	Code	Name	
			Design and develop solutions for Data Centers using SDN frameworks.
79.	18CSE22	Human Computer Interaction	Identify Shneiderman, Stone and Nielsen paradigms for interaction between Human and computer.
			Distinguish the usability of Goals, Measures, Motivations to solve real-time applications.
			Interpret the command languages and models used in communication and collaboration with interconnected entities.
			Outline the Process, Frameworks, Methods, Tools for Designing interactive systems, and Relate the Social Impact Analysis, Legal Issues.
			Review user experiences Familiarize with nonanthromorphic design and models of System Response Time impacts.
			Analyze the Extended, Augmented, Mixed and Virtual Reality techniques to deal with real-time applications.
80.	18CSE23	Neural Networks and Deep Learning	Understand various learning models.
			Design and develop various Neural Network Architectures.
			Understand approximate reasoning using Convolution Neural Networks.
			Developing deep learning algorithms for various applications.
			Apply Neural Network and Deep learning techniques to solve different applications
81.	18CSE24	Devops	Identify components of Devops environment
			Describe Software development models and architectures of DevOps
			Apply different project management, integration, testing and code deployment tool
			Investigate different DevOps Software development models
			Assess various Devops practices
			Collaborate and adopt Devops in real-time projects
82.	18CSE25	Nature Inspired Algorithms	Identify the relation between computers (computing) and natural processes.
			Describe concepts of Evolutionary Computing like Genetic Algorithms to solve engineering optimization problems.
			Apply Swarm Intelligence like ACO and PSO to Travelling Salesman Problem.
			Explain Danger theory and its role in various Immuno Computing Models.
			Solve the SAT problem by using DNA manipulation functions and Filtering Models.
			Familiarize with test tube programming.
83.	18ECO 01	Remote Sensing and GIS	Demonstrate the understanding of basic concepts of remote sensing and interpret energy interactions.
			Choose an appropriate technique for a given scenario by appreciating the types of remote sensing.
			Distinguish the principle behind the working of microwave and

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SNo	Course		Course Outcomes Statements
	Code	Name	
			LiDAR sensing.
			Apply an appropriate data model from the acquired knowledge of the basics of GIS.
			Explain the procedure for encoding data and geospatial data analysis
84.	18ECO 03	Design of Fault Tolerant Systems	Identify various types of faults & failures and analyze reliability of systems
			Model and evaluate redundancy concept in digital systems
			Construct fail safe and self-checking circuits
			Develop testable combinational digital circuits
			Design of built in self-test for VLSI circuits
85.	18ECO 04	Fundamentals of Digital Signal Processing	Understand the concept of Discrete time signals and systems
			Analyze the frequency domain representation of discrete time sequence using DTFT and DFT.
			Apply FFT to the given sequence.
			Implementation of FIR filter for the given specifications
			Design an IIR filter for the given specifications.
86.	18CEO 02	Disaster Mitigation and Management	Identify and understand the fundamental terminologies in disaster management.
			Distinguish between the Hydro-meteorological disasters and apply the concepts of structural and non- structural mitigation measures.
			Categorize different Geographical Disasters and apply the knowledge in utilizing the early warning systems.
			Analyze various mechanisms and consequences of human induced disasters.
			Develop an awareness of disaster management phases and formulating effective disaster management plans, ability to understand various participatory roles of stakeholders- Central and State Government bodies at different levels.
87.	18EGO 01	Technical Writing Skills	Process of communication and channels of communication in general and technical writing
			Technical Writing and also contextual use of technology specific words
			Business letters and technical articles
			Technical reports and technical proposals.
			Transferring data from verbal to graphic and vice versa and making technical presentations
88.	18CSC29	Compiler Design Lab	Implement the rules for the analysis phase of a compiler.
			Apply various Syntax analysis techniques on grammars to build the parsers.
			Generate various intermediate code representations for source code.
			Explore error recovery strategies and implement Code Optimization, code generation phases.
			Examine the concepts of compiler tools Lex, Flex Vision, Yacc, Turbo C.

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SNo	Course		Course Outcomes Statements
	Code	Name	
89.	18CSE26	Data Science and Big data Analytics Lab	Implement and apply data science algorithms to solve problems.
			Implement various the exploratory data analysis techniques to understand the data.
			Work with big data platform and explore the big data analytics techniques business applications.
			Design efficient algorithms for analyzing the data from large volumes.
			Analyze the HADOOP and Map Reduce technologies associated with big data analytics.
90.	18CSE27	Machine Learning Lab	Identify the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.
			Identify and utilize modern tools that are useful for data analysis
			Recognize and implement various ways of selecting suitable model parameters for different machine learning techniques.
			Implement and evaluate various Machine Learning approaches
			Apply Keras and Tensorflow to implement ML techniques
			Design and develop solutions to real world problems using ML techniques
91.	18CSE28	Virtual Reality Lab	Analyse the Hardware and Software requirements for Virtual Reality
			Apply Virtual Reality based technologies to create virtual components.
			Design solutions for the simple real world problems.
			Implement solutions for the simple world problems.
			Evaluate the benefits and drawbacks of specific VR techniques on the human body.
			Develop Virtual Reality based solutions for complex real world problems
92.	18CSE29	Cyber Security Lab	Understand the security and privacy features and operation of browsers and websites.
			Understand the security issues and vulnerability in Email system E-commerce services.
			Point out the vulnerabilities in TCP/IP Protocols used for communications.
			Analyze the Network Traffic for any security issues and performing the steps for the identification of Virus.
			Discuss different types of cybercrimes and describe the laws governing cyberspace.
93.	18CSC30	Project : PART-1	Review the literature related to the problem area / selected topic
			Undertake problem identification, formulation and solution
			Prepare synopsis of the selected topic
			Gather the required data and Set up the environment for the implementation
			Conduct preliminary analysis/modeling/simulation experiment
			Communicate the work effectively in both oral and written forms
94.	18CSE30	Bioinformatics	Identify the basics concepts of Bioinformatics and its significance

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SNo	Course		Course Outcomes Statements
	Code	Name	
			in Biological data analysis.
			Explore the basic algorithms used in pair wise alignment and multiple sequence alignment.
			Apply various Bioinformatics tools and techniques employed in Biological Sequence Analysis.
			Analyze computational experiments for training and evaluating machine learning methods such as EM/GEM, HMM, Monte Carlo
			Choose and apply appropriate data mining methods like classification, clustering for solving complex biological problems.
			Interpret the algorithms and tools used for simulation in biological processes and in analysis of biological data
95.	18CSE31	Speech and Natural Language Processing	Define the basic concepts of speech sound, phonetics, signals origins and applications of Natural Language processing.
			Discuss about the language modeling techniques.
			Identify the basic words, parsers and various levels in processing of natural language.
			Explain the various semantics discourse and pragmatic levels of NLP.
			Analyze Natural language Generation and apply machine translation.
			Implement levels of NLP system using lexical resources to demonstrate Morphology of a language.
96.	18CSE32	Social Networking and its Impact	Identify the significance of social networks, representation, ranking techniques and challenges.
			Understand a broad range of social networks concepts and theories.
			Ascertain the network analysis knowledge in a diversified aspect of society.
			Analyze social network links and web search.
			Differentiate between centralized and decentralized search models.
			Generate and Communicate the analysis results and impact of social networks.
97.	18CSE33	Blockchain Technology	State the basic concepts and design primitives of blockchain.
			Understand the significance of Consensus mechanisms.
			Interpret the working of Hyperledger Fabric, SDK composer tool.
			Demonstrate the significance of blockchain in financial, supply chain and government sector based use cases.
			Analyze the need of blockchain mechanisms in Cryptography.
98.	18PYO01	History of Science and Technology	Demonstrate the process of beginning of science and civilization, knowledge acquisition and philosophical approach of science and its advancements in the Stone Ages and Antiquity period.
			Illustrate the advancements in science and technology in the medieval period across Asia and Arab countries and decline and revival of science in Europe.
			Explain the scientific approach and its advances of the Europeans and how the role of engineer during the industrial revolution and the major advancements.

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SNo	Course		Course Outcomes Statements
	Code	Name	
			Make use of the advancements in the field of science and technology by adopting new philosophies of 19th and first half of 20th century in finding ethical solutions to the societal problems.
			Interpret the changes in specializations of science and the technology and build the relation between information and society from second half of 20th century onwards.
99.	18MEO01	Robotics	Describe the basic components, specifications and applications of the robots.
			Understand transformations, direct and inverse kinematics of robots.
			Calculate forces in links and joints of a robot and find the singularities, Jacobian and trajectory planning of a robot for various tasks.
			Classify drives, sensors and grippers for various applications.
			Program a robot to predict motions for a given task with machine vision and sensors.
100.	18MEO03	Research Methodologies	Define research problem.
			Review and assess the quality of literature from various sources.
			Understand and develop various research designs.
			Analyze problem by statistical techniques: ANOVA,F-test, Chi-square.
			Improve the style and format of writing a report for technical paper/Journal report.
101.	18MEO04	Entrepreneurship	Understand the concept and essence of entrepreneurship.
			Identify business opportunities and nature of enterprise.
			Analyze the feasibility of new business plan.
			Apply project management techniques like PERT and CPM for effective planning and execution of projects.
			Use behavioral, leadership and time management aspects in entrepreneurial journey.
102.	18MEO12	3D Printing	Understand the concept of 3D printing processes, advantages and limitations.
			Evaluate real-life scenarios and recommend the appropriate 3D printing technology.
			Analyze various pre-processing and post processing techniques.
			Explain current and emerging 3D printing technologies in diversified applications.
			Identify components required in construction of 3D printer.
103.	18CSC31	Technical Seminar	Study research papers for understanding of new field in the absence of a textbook to summarize and review them
			Identify promising new directions of various cutting edge technologies in Computer Science and Engineering
			Impart skills in preparing detailed report describing the selected topic/area
			Acquire skills to write technical papers/articles for publication
			Effectively communicate by making an oral presentation before an

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SNo	Course		Course Outcomes Statements
	Code	Name	
			evaluating committee
104.	18CSC32	Project : PART-2	Demonstrate a sound technical knowledge of their selected topic
			Design engineering solutions to complex problems utilizing a systematic approach
			Conduct investigations by using research-based knowledge and methods to provide valid conclusions
			Create/select/use modern tools for the modeling, prediction and understanding the limitation of complex engineering solutions
			Communicate with engineers and the community at large in written and oral forms
			Demonstrate the knowledge, skills and attitudes of a professional engineer

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Gandipet, Hyderabad -75
Department Of Computer Science and Engineering
Course Outcomes Statements for R16

SNo	Course Name	Course Code	Course Outcomes Statements
1	Engineering Mathematics - I	16MTC01	Solve system of linear equations and identify the Eigen values and Eigen vector in engineering problems
			Expand and find extreme values of functions of two variables
			Trace and interpret curve behavior in physical systems
			Find the areas, volumes and surface of solids revolution
			Use-differential equations to model engineering phenomena such as circuit theory, networks
			An ability to solve the problems and interpret it in geometrical approach
2	Engineering Physics	16PYC01	Describe the types of oscillations and analyze them
			Demonstrate the wave nature of the light
			Develop the concepts related to electromagnetic behavior
			Identify the various crystal systems and defects
			Explain the origin of magnetism and dielectric polarization and applications of these materials in the field of engineering & technology
3	Applied Chemistry	16CYC02	Identify the various methods used in treatment of water for domestic and industrial use.
			Illustrate the mechanism of various types of Corrosion & its prevention
			Discuss the polymers which gives better insight to industrial applications
			Describe the charging & discharging reactions in batteries & Fuel cells
			Outline the synthesis of nano materials and their applications
			Classify the Composite materials and their applications in space technology.
4	Elements of Electrical Engineering	16EEC01	Acquire the knowledge of basic Concepts of electrical circuits such as Ohm's law, Kirchhorff's laws etc.
			Acquire the knowledge of basic Faraday's laws of electromagnetic induction.
			Acquire the knowledge to solve the problem of AC circuits.
			Acquire the knowledge of specifications of batteries, types of cells and sources of renewable energy.
			Acquire the knowledge of electrical wiring and cables and their types and electrical equipment and their specification.
			Acquire the knowledge of safety precautions in handling electrical appliances, importance of grounding and methods of earthing
5	Engineering Mechanics	16CEC01	Solve problems dealing with forces in planar force systems
			Draw free body diagrams to analyze the forces in the given structure
			Understand the Concept of moments and Couples in plane systems.
			Understand the mechanism of friction and can solve friction problems
			Determine the centroid of plane areas and centers of gravity of bodies using integration methods
			Determine moments of inertia, product of inertia for all areas and mass moments of inertia for bodies,
6	Professional Communication in English	16EGC01	Understand the nature, process and types of Communication and will Communicate effectively without barriers.
			Understand the nuances of listening and will learn to make notes
			Read different texts, Comprehend and draw inferences and Conclusions.
			Write effective paragraphs, letters and reports
			Critically analyze texts and write book reviews
7	Environmental Studies	16CEC02	To understand the scope and importance of environmental studies, identify the natural resources and ecosystems and contribute for their conservation.

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			To understand the ecological services of biodiversity and contribute for their conservation.
			To develop skills to solve the problems of environmental pollution and Contribute for the framing of legislation for protection of environment.
			To relate the social issues and the environment and Contribute for the sustainable development.
			To understand the essence of the ethical values of the environment for Conserving depletable resources and pollution Control.
8	Engineering Graphics	16MEC02	Use of various drawing instruments, grades of pencils. Different types of lines, letters, number, Geometric constructions
			Draw Ellipse, Parabola, Hyperbola, cycloidal and involute curves by various methods
			Draw orthographic projections of points, Straight lines inclined to one and both the reference planes
			Draw projection of perpendicular planes and oblique planes
			Draw projection of solids inclined to one plane and parallel to another reference plane and section of solids in simple position
			Use basic drawing and editing commands using graphic packages
9	Engineering Physics Laboratory	16PYC03	Understand the Concept of errors and find the ways to minimize the errors
			Demonstrate interference and diffraction phenomena experimentally
			Distinguish between polarized and unpolarized light
			Determine the loss of energy of a ferromagnetic material and its uses in electrical engineering
			Understand the suitability of dielectric materials in engineering applications
10	Applied Chemistry Laboratory	16CYC04	Identify the basic chemical methods to analyze the substances quantitatively.
			Determine the hardness of water for both domestic & industrial purpose
			Identify the amount of alkalinity present in various water samples.
			Calculate the amount of Strong & weak acids by Conductometric methods.
			Estimate the chemical Compounds using their potentials by instrumental methods
11	Professional Communication Laboratory	16EGC02	he students will understand the speech sounds in English and the nuances of pronunciation.
			The students will understand tone, intonation and rhythm and apply stress Correctly.
			The students will be able to participate in group discussions with clarity and Confidence.
			The students will speak Confidently on stage with appropriate body language.
			The students will debate on various issues and learn to work in teams.
12	Engineering Mathematics -II	16MTC02	Solve the solutions of Differential Equations which arise in electrical circuits, vibrations and other linear systems.
			Able to solve solutions of differential equations with initial and boundary value problems.
			Evaluating definite integrals using Beta, Gamma functions.
			Understating the significance of gradient, divergent and Curl.
			Use Greens, Gauss and Stoke"s theorems to find the surface and volume integrals.
			Able to solve and analyse the Engineering problems.
13	Engineering Chemistry	16CYC01	Identify the spontaneous and non-spontaneous processes
			Describe the concepts in the separation of metals from mixture of metals
			Classify the conventional sources of energy and their importance.
			Explain the concepts of electrochemistry to produce electrical energy
			Illustrate the various instrumental methods to analyze the chemical compounds
			Discuss the principles of Green Chemistry
14	Applied Physics	16PYC02	Understand the advances in laser physics, holography, optical fibers and

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			apply them in engineering & technology
			Explain the importance of wave mechanics and band theory of solids
			Analyze and apply distributions of statistical mechanics for problem solving
			Identify the materials with semiconducting and superconducting properties for engineering applications
			Understand the role of novel materials and their characterization techniques in engineering and technology
15	Programming and Problem Solving	16CS C01	Develop algorithms for scientific problems.
			Explore algorithmic approaches to problem solving.
			Understand the components of computing systems.
			Choose data types and structure to solve mathematical problem.
			Develop modular programs using control structure, arrays and structures.
			Write programs to solve real world problems using structured features.
16	Elements of Mechanical Engineering	16MEC01	Select the material depending upon requirement.
			Evaluate performance of Petrol & Diesel engines.
			Demonstrate his/her knowledge in preparing process chart for various machining operations.
			Estimate the power required for various power transmitting devices like belt and gear trains.
			Become a successful entrepreneur after studying principles of management.
			Apply various quality control techniques after studying principles of industrial engineering.
17	Elements of Electronics and Communication Engineering	16ECC01	Familiar with the basic electronic devices and simple circuits
			Work with Boolean algebra principles, build the simple combinational and sequential circuits
			Appreciate the need for modulation, filtering and multiplexing
			Understand the working principles of a few communication systems
			Familiar to the selected applications
18	Professional Ethics and Human Values	16CEC03	Students develop the capability of shaping themselves into outstanding personalities, through a value based life.
			Students turn themselves into champions of their lives.
			Students take things positively, convert everything into happiness and contribute for the happiness of others.
			Students become potential sources for contributing to the development of the society around them and institutions/ organizations they work in.
			Students shape themselves into valuable professionals, follow professional ethics and are able to solve their ethical dilemmas.
19	Programming Laboratory	16CS C02	Identify and setup Integrated Development Environment for program development
			Apply C language constructs to solve mathematical and scientific calculation
			Debug C programs using modern tools
			Represent data as arrays, pointer, structures and manipulate
			Design and develop modular programs using functions for solving complex problems
			Develop applications using file
20	Mechanical and IT Workshop	16MEC03	To make a perfect rectangular MS flat
			To do parallel cuts using Hack saw
			To drill a hole and tap it
			To make male and female fitting using MS flats-Assembly1
			To make male and female fitting using MS flats-Assembly2
21	Applied Physics Laboratory	16PYC04	Understand the various applications of semiconductor devices and their suitability in engineering
			Demonstrate the working of lasers and optical fibers and their applications in the field of Communication
			Analyze the electrical properties of a given solid based on its energy band

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			gap
			Verify the resistance and thermoelectric power properties with temperature variation
			Demonstrate the Concept of electron and its charge experimentally
22	Engineering Chemistry Laboratory	16CYC03	Identify the basic Concepts in chemical analysis of various substances
			Estimate the amount of chemical substances by volumetric analysis.
			Calculate the Concentration and amount of various substances using instrumental techniques
			Determine the distribution Coefficient of immiscible liquids
			Develop the procedures to synthesize the basic polymeric Compounds.
23	Engineering Mathematics – III	16MTC05	Expand functions in the given intervals.
			Solve linear and non linear PDEs.
			Solve one-dimension, two-dimension, Heat steady state equations and also one-dimension wave equation.
			Solve problems on Analytic functions, Cauchy's theorem and Cauchy's integral formula.
			Expand functions by using Taylor's and Laurent's series.
			Solve Real and Complex integrals by using Cauchy Theorems.
24	Data Structures	16CS C03	Understand the importance of abstract data type and implementing the concepts of data structure using abstract data type.
			Evaluate an algorithm by using algorithmic performance and measures.
			Distinguish between linear and non-linear data structures and their representations in the memory using array and linked list.
			Develop applications using Linear and Non-linear data structures.
			Apply the suitable data structure for a real world problem and think critically for improvement in solutions.
			Determine the suitability of the standard algorithms: Searching, Sorting and Traversals.
25	Object Oriented Programming using Java	16CS C04	Identify classes, objects, members of a class and the relationships needed to solve a problem.
			Use interfaces and creating user-defined packages.
			Utilize exception handling and Multithreading concepts to develop Java programs.
			Compose programs using the Java Collection API.
			Design a GUI using GUI components with the integration of event handling.
			Create files and read from computer files.
26	Logic and Switching Theory	16CS C05	Can familiarize with number systems, simplification of Boolean functions.
			Be able to manipulate simple Boolean expressions using maps and tabulation method.
			Realize and Implement logic circuits by using Universal gates.
			Ability to Design basic digital circuits in Computer Hardware and system.
			Ability to use high level Hardware Description languages such as VHDL for the design of Combinational and Sequential circuits.
			Be able to configure registers and counters for different applications.
27	Discrete Structures	16CS C06	Apply Propositional and Predicate logic for a variety of problems in various domains.
			Understand Set Theory, Venn Diagrams, relations, functions and apply them to Real-world scenarios.
			Model and solve the real world problems using Generating Functions and Recurrence Relations.
			To identify the basic properties of graphs and trees and use these concepts to model simple applications.
			Understand General properties of Algebraic systems and study lattices as partially ordered sets and their applications.
			Apply the knowledge and skills obtained to investigate and solve a variety of discrete mathematics problems.

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28	Data Structures Lab	16CSC07	Implement the abstract data type and reusability of a particular data structure.
			Implement linear data structures such as stacks, queues using array and linked list.
			Understand and implements non-linear data structures such as trees, graphs.
			Implement various kinds of searching, sorting and traversal techniques and know when to choose which technique.
			Understanding and implementing hashing techniques.
			Decide a suitable data structure and algorithm to solve a real world problem.
29	Object Oriented Programming Lab using java	16CS C08	Design interfaces and packages.
			Compose program for implementation of multithreading concepts.
			Develop program using Collection Framework.
			Develop small GUIs using GUI components with the integration of event handling.
			Handle I/O Streams from various sources.
			Write programs using the Java Concepts.
30	Soft Skills and Employability Enhancement Lab	16EGC03	Be effective communicators and participate in group discussions and case studies with confidence. Also be able to make presentations in a professional context.
			Write resumes, prepare and face interviews confidently.
			Be assertive and set short term and long term goals. Also learn to mange time effectively and deal with stress.
			Make the transition smoothly from Campus to Corporate. Also use media with etiquette and know what academic ethics are.
			To do a live, mini project by collecting and analyzing data and making oral and written presentation of the same.
31	Mini Project-I	16CSC09	Practice acquired knowledge within the chosen area of technology for project development
			Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach
			Reproduce, improve and refine technical aspects for engineering projects
			Work as an individual or in a team in the development of technical projects
			Interpret, analyze and evaluate the experimental results
			Effectively communicate and report the project effectively activities and findings
32	Data Base Management Systems	16CS C10	Classify the difference between FMS and DBMS; describe the roles of different users and the structure of the DBMS.
			Design the database using ER modeling and Write queries using DDL, DML and DCL of SQL, Relational Algebra and Procedures, Functions using PL/SQL
			Outline the inference rules for functional dependencies and apply the principles of normal forms to decompose the relations in a database.
			Summarize basic concepts of storage techniques like indexing, hashing and familiar with states and properties of transaction.
			Illustrate locking, time stamp, graph and validation-based protocols for concurrency control.
			Relate log based, ARIES recovery techniques to increase the robustness of the database, identify to resolve the deadlocks in the transaction.
33	Web Technologies	16CS C11	Develop sites using XHTML using CSS and XML.
			Develop form processing using java scripts.
			Develop Dynamic web site using PHP applications.
			Develop Dynamic web content using Java Servlets and JSP.
			Develop JDBC connections and implement a complete Dynamic web application.
34	Computer Architecture and	16CS C12	Ability to understand the merits and pitfalls in computer performance measurements.

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	Micro Processors		Achieve Technical knowledge on the advantage of instruction level parallelism and pipelining for high performance processor design.
			Identify the basic elements and functions of 8086 microprocessors.
			Understand the instruction set of 8086 and use them to write assembly language programs.
			Demonstrate fundamental understanding on the operation between the microprocessor and its interfacing devices.
			Ability to write complex programs involving interface with various peripheral devices.
35	Probability and Statistics Using R	16CS C13	Know the fundamentals of probability and statistics.
			Understand and interpret different types of data.
			Apply statistical tools on data sets.
			Understand and use the R tool for statistical analysis.
			Evaluate various testing on data.
			Apply the concepts of statistics to real-life datasets and analyze using R.
36	Engineering Economics and Accountancy	16MBC01	apply fundamental knowledge of Managerial economics concepts and tools.
			understand various aspects of demand analysis and forecasting.
			understand price determination for different markets.
			study production theory and analyze various costs & benefits involved in it so as to make best use of resources available.
			analyze different opportunities and come out with best feasible capital investment decisions
			apply accountancy concepts and conventions, Final accounts and financial analysis.
37	Data Base Management Systems Lab	16CS C14	Outline the built-in functions of SQL and apply these functions to write simple and complex queries using SQL operators .
			Demonstrate Queries to Retrieve and Change Data using Select, Insert, Delete and Update. Construct Queries using Group By, Order By and Having Clauses
			Demonstrate Commit, Rollback , Save point commands , SQL Plus Reports and Write Queries for Creating, Dropping and Altering Tables, Views, constraints .
			Develop queries using Joins, Sub-Queries and Working with Index, Sequence, Synonym, Controlling Access and Locking Rows for Update, Creating Password and Security features.
			Demonstrate the usage of data types , Bind and Substitution Variables , Anchored, Declarations ,Assignment Operation and PL/SQL code using Control Structures .
			Develop PL/SQL code using Cursors, Exception, Composite Data Types and Procedures, Functions and Packages.
38	Web Technologies Lab	16CS C15	Students will be able to develop static web sites using XHTML and Java Scripts.
			To implement XML and XSLT for web applications.
			Develop Dynamic web content using Java Servlets and JSP.
			Use JDBC and web content using PHP.
			Handle Sessions and use servlet filters in web applications.
			Develop a dynamic web application using all the technologies learnt in the course.
39	CA and MP Lab	16CS C16	Understand and apply the principles of Assembly Language Programming
			Understand instruction formats and addressing modes of 8086.
			Comprehend the instruction set of 8086.
			Get familiarized with different assembly language software tools.
			Interface various peripherals with microprocessor.
			Apply the Micro Processor concepts on real-time applications.
40	Linux Programming	16CSE01	Understand the structure and environment of Linux operating system.
			Understand the features of scripting languages.

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	and Scripting Languages		Develop applications in Linux environment. Create and run scripts using Perl/TCL/Python. Write shell scripts for the automation of system administration.
41	Principle of Programming Languages	16CSE02	program in different language paradigms and evaluate their relative benefits. Gains knowledge of, and ability to use, language features in current programming languages. Develop algorithms for problem solving. Identify and describe semantic issues associated with variable binding, scoping rules, parameter passing, and exception handling. Understand the design issues of object-oriented and functional languages. familiarity with using logic languages
42	Shell Scripting	16CSE03	Understand the basics of Linux shell scripting. Familiarize with basic commands and text filtering tools. Write shell scripts for automation to save and create utilities. Start up a system and customize a Linux system using scripts. Control administrative tasks such as Linux user management, system monitoring etc. Identify patterns using Linux/Unix tools.
43	Design and Analysis of Algorithms	16CSC17	Describe asymptotic notation used for denoting performance of algorithms. Analyze the performance of a given algorithm and denote its time complexity using the asymptotic notation for recursive and non-recursive algorithms. List and describe various algorithmic approaches. Solve problems using divide and conquer, greedy, dynamic programming, backtracking and branch and bound algorithmic approaches. Apply graph search algorithms to real world problems. Demonstrate an understanding of NP- Completeness theory and lower bound theory
44	Automata Languages and Computation	16CSC18	Identify the fundamental Concepts of automata theory and discuss about the various levels of Chomsky hierarchy Define regular expressions, grammars and Design automata for different languages Define the regular, closure and decision Properties of the language and prove the membership Examining the key properties of formal languages and automata by performing prove and disprove theorems Demonstrate the principles behind the basic abstract computing model and its variants Distinguish decidability and un decidability problems and variants of language models
45	Operating Systems	16CSC19	To develop the knowledge of the role of operating system and its design To implement the knowledge of multiprogramming, multithreading, deadlocks. To analyze the concept of IPC and resource sharing among the users. To understand of memory management including virtual memory. Analyze various Disk scheduling algorithms and I/O operation implementation techniques Familiar with security mechanisms and understand the features of Linux and Windows Operating systems
46	Data Communication and Computer Networks	16CSC20	Understand the communication protocol suites like ISO-OSI and TCP/IP. Understand and explain Data Communications System and its components Identify and evaluate various routing algorithms, congestion control algorithms. Identify and use internet protocols like IP, ARP, ICMP, IGMP, BGP, OSPF, and DHCP etc. Know the working of transport layer protocols like TCP, UDP, RTCP etc.

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			Understand about the applications (like WWW, DNS, email etc.) and the underlying protocols.
47	Software Engineering	16CSC21	Assessment in each module gives the overall Software engineering practice
			Demonstrate the necessary skills to enhance the software project management
			Understand the systematic methodologies involved in SE
			Understand design and develop a software product in accordance with SE principles
48	Operating Systems Lab	16CSC22	To use Unix utilities and perform basic shell control of the utilities
			To use the Unix file system and file access control.
			To write programs systems based on multiple cooperating processes or threads
			To implement process scheduling, synchronization and memory management algorithms.
			To implement process synchronization problems
			To implement process deadlocks.
49	Data Communication and Computer Networks Lab	16CSC23	Become familiar with different types of equipment and cables used in the networks lab
			Identification of various network devices
			Familiarity of basic network commands
			Ability to assign an IP address to a PC
			Ability to connect a PC to the LAN
			Design network topologies using simulation tools
50	Software Engineering Lab	16CSC24	1.Identify the problem scope and constraints of the problem.
			2.Prepare the requirements specification for the system to be developed according to IEEE standards.
			3.Apply the design notations of structured approach to develop ER and Data Flow Diagrams.
			4.Apply/Use the design notations of Object-oriented approach to develop UML diagrams using Rational tools.
			5. Develop the Test cases to validate the proposed system.
			6. Analyze the implementation and prepare the documentation for the proposed system.
51	Mobile Application Development	16CSE04	Ability to evaluate and select appropriate solutions to the mobile computing platform.
			Ability to develop the user interface.
			Ability to develop database management system to retrieve data for mobile application
			Ability to build a simple mobile application.
			Develop and Deploy mobile applications
52	Computer Graphics	16CSE05	Review the core concepts of computer graphics.
			Analyse graphics techniques for rasterization, clipping, curve generation etc.
			Evaluate pictures using various algorithms.
			Understand the pipeline of typical graphics
			Interpret and apply relevant problem solving methodologies
53	Compiler Construction	16CSC25	Identify the basic concepts needed for the development of a compiler
			Analyze the various phases and Tools of a Compiler
			Describe the differences between Top down and Bottom up Parsers and apply parsing methods for various grammars.
			Compare and Contrast Symbol table organization for Block structured and non-Block structured languages.
			Analyze the concepts involved in Intermediate, code generation and Code Optimization Process.
			Recognize the various types of errors and error recovery strategies in phases of Compilation.
	Artificial	16CSC26	Differentiate between a rudimentary Problem and an AI problem, it's

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54	Intelligence		Characteristics and problem solving Techniques.
			Determine and evaluate the various search strategies.
			Compare and contrast the various "knowledge representation" schemes of AI.
			Understand and Analyze the various reasoning techniques involved in solving AI problems.
			Understand the different learning techniques.
			Apply the AI techniques to solve the real world problems using Prolog.
55	Mobile Computing	16CSC27	Gain knowledge in the fundamental concepts of mobile computing
			Understand the principles of wireless transmission and cellular networks
			Compare various telecommunication systems and broadcasting techniques
			Identify various wireless LAN and routing protocols for different environments
			Understand file systems and transaction for mobility support
			Will have an understanding of social and ethical issues of mobile computing and privacy issues
56	Information and Network Security	16CSC28	Understand the most common type of information and network threat sources.
			Be able to determine appropriate mechanisms for protecting the network.
			Design a security solution for a given application, system with respect to security of the system
			Understand the information and network security issues and apply the related concepts for protection and communication privacy.
			Understand application security using smart- cards.
			Understand the operation of e-payments, micro- payments and related security issues, protocols.
57	Internet of Things	16CSC29	Understand the Architectural Overview of IoT
			Use of Devices, Gateways and Data Management in IoT.
			Building state of the art architecture in IoT.
			Understand various protocols used in IoT.
			Understand Application of IoT in Industrial and Commercial Building Automation.
			Understand Real World Design Constraints.
58	Information and Network security Lab	16CSC30	Demonstrate detailed knowledge of the role of encryption to protect data.
			Analyze security issues arising from the use of certain types of technologies.
			Master protocols for security services.
			Master on the key exchange and Authentication protocols.
59	Internet of Things Lab	16CSC31	Use different types of sensors in various IoT Systems.
			Use of devices, Gateways and Database Management in IoT.
			Working with ESP8266 to implement various IoT systems.
			Working with Raspberry-Pi to implement various IoT Systems.
			Understand Application of IoT in Agriculture and Industries.
			Understand Real World Design Constraints.
60	Mini Project-II	16CSC32	Practice acquired knowledge within the chosen area of technology for project development
			Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach
			Reproduce, improve and refine technical aspects for engineering projects
			Work as an individual or in a team in the development of technical projects
			Interpret, analyze and evaluate the experimental results
			Effectively communicate and report the project effectively activities and findings
61	Computer Vision	16CSE07	To understand concepts necessary in this field, to explore and contribute to research and further developments in the field of computer vision.
			To apply in the field of Biometrics, Medical diagnosis, document processing, mining of visual content, to surveillance, advanced rendering

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			etc.
62	Soft Computing	16CSE08	Understand various soft computing techniques. Understand various learning models. Design and develop various Neural Network Architectures. Understand approximate reasoning using fuzzy logic. Analyze and design Genetic algorithms in different applications. Ability to apply soft computing techniques to solve different applications.
63	Data Mining	16CSE09	Understand the process, issues and challenges of knowledge discovery Identify and analyze the significance and working of various data preprocessing methods. Understand operational database, warehousing, and multidimensional need of data base to meet industrial needs. Explore the concepts of market basket analysis to generate association rules. Analyze and Evaluate the performance of Classification and Clustering algorithms Understand the significance and methodologies of outlier detection Schemes
64	Data Science and Big Data Analytics	16CSC33	Understands various phases of the data analytics life cycle. Apply statistical methods to data for inferences. Analyze data using Classification, Graphical and computational methods. Understands Big Data technologies and NOSQL. Analyze various types of data using Data Analytics Techniques.
65	Free and Open Source Software	16CSC34	Differentiate between Open Source and Proprietary software and Licensing. Recognize the applications, benefits and features of Open Source Technologies. Understand and demonstrate Version Control System along with its commands. Gain knowledge to start, manage open source projects. Understand and practice the Open Source Ethics.
66	Distributed and Cloud Computing	16CSC35	Understand the characteristics and models in distributed computing. Define Cloud Computing and related concepts and describe the characteristics, advantages, risks and challenges associated with cloud computing. Explain and characterize various cloud services and deployment models, virtualization techniques. Illustrate the concepts of cloud storage and demonstrate their use. Analyze various cloud programming models and apply them to solve problems
67	Machine Learning	16CSC36	Define the basic concepts related to Machine Learning Recognize the underlying mathematical relationships within and across Machine Learning algorithms and their paradigms Determine the various applications of machine learning Model the problems using various machine learning techniques Design and develop solutions to real world problems using Machine Learning Algorithms Evaluate and interpret the results of the various machine learning techniques
68	DSBDA Lab	16CSC37	Implement and apply data science algorithms to solve problems Implement various the exploratory data analysis techniques to understand the data. Work with big data platform and explore the big data analytics techniques business applications. Design efficient algorithms for analyzing the data from large volumes. Analyze the HADOOP and Map Reduce technologies associated with big data analytics.
69	ML Lab	16CSC38	Understand complexity of Machine Learning algorithms and their limitations. Identify and understand modern tools that are useful in data analysis

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			Implement analyze Machine Learning algorithms
			Use Keras and Tensorflow packages to implement the solutions
			Design and develop solutions to real world problems using ML techniques
			Evaluate and interpret the results of the various machine learning techniques
70	Project Seminar	16CSC39	Survey and study of published literature on the assigned topic;
			Working out a preliminary Approach to the Problem relating to the assigned topic;
			Conducting preliminary Analysis/Modeling/Simulation/Experiment/Design/Feasibility;
			Preparing a Written Report on the Study conducted for Presentation to the Department;
			Final Seminar, as oral Presentation before a Department Review Committee.
71	Deep Learning	16CSE10	Understand various learning models.
			Design and develop various Neural Network Architectures.
			Understand approximate reasoning using Convolution Neural Networks.
			Analyze and design Deep learning algorithms in different applications.
			Ability to apply CNN and RNN techniques to solve different applications.
72	NIA	16CSE12	Understand The basics Natural systems
			Learn the concepts of Natural systems and its applications
			Understand different basic Natural systems functions(operations)
			Understand Natural design considerations
			Apply to real world problems
73	Disaster Mitigation and Management	16CEO02	Analyze and critically examine existing programs in disaster management regarding vulnerability, risk and capacity at different levels.
			Understand and choose the appropriate activities and tools and set up priorities to build a coherent and adapted disaster management plan.
			Understand various mechanisms and consequences of human induced disasters for the participatory role of engineers in disaster management.
			Understand the impact on various elements affected by the disaster and to suggest and apply appropriate measures for the same.
			Develop an awareness of the chronological phases of disaster preparedness, response and relief operations for formulating effective disaster management plans and ability to understand various participatory approaches/strategies and their application in disaster management.
74	Entrepreneurship	16MEO01	Identify opportunities and deciding nature of industry
			Brainstorm ideas for new and innovative products or services
			Analyze the feasibility of a new business plan and preparation of Business plan
			Use project management techniques like PERT and CPM
			Analyze behavioural aspects and use time management matrix
75	Research Methodologies	16MEO06	Define research problem
			Review and asses the quality of literature from various sources.
			Understand and develop various research designs.
			Analyze problem by statistical techniques: ANOVA, F-test, Chi-square
			Improve the style and format of writing a report for technical paper/ Journal report
76	Seminars	16CSC40	To study current emerging areas of professional interest.
			To identify promising new directions of various cutting edge technologies
			To analyze and make use of appropriate methodologies .
			To pursue their interest in Computer Science & Engg., through design, research, theoretical and experimental approach.
			To effectively use modern technologies for presentation before an evaluation committee
			To acquire skills in preparing detailed report.
77	Projects	16CSC41	Demonstrate a sound technical knowledge of their selected topic
			Design engineering solutions to complex problems utilizing a systematic

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			approach
			Conduct investigations by using research-based knowledge and methods to provide valid conclusions
			Create/select/use modern tools for the modeling, prediction and understanding the limitation of complex engineering solutions
			Communicate with engineers and the community at large in written and oral forms
			Demonstrate the knowledge, skills and attitudes of a professional engineer
78	Cyber Security	16CSE14	Discuss different types of cybercrimes and analyze legal frameworks to deal with these cybercrimes.
			Describe Tools used in cybercrimes and laws governing cyberspace.
			Analyze and resolve cyber security issues.
			Recognize the importance of digital evidence in prosecution.
			Analyze the commercial activities in the event of significant information security incidents in the Organization.
			Discuss different types of cybercrimes and analyze legal frameworks to deal with these cybercrimes.
79	NLP	16CSE16	Define the basic concepts of grammars languages and applications of Natural Language processing --
			Discuss about the language modelling techniques
			Identify the basic words, parsers and various levels in processing of natural language.-
			Explain the various semantics discourse and pragmatic levels of NLP
			Analyze Natural language Generation and apply machine translation.
			Implement levels of NLP system using the Components or lexical resources to demonstrate Morphology / syntax of a language.
80	Bioinformatics	16CSE18	Understand the basics concepts of Bioinformatics and its significance in Biological data analysis.
			Represent biological information using various algorithms
			Apply data mining and pattern matching techniques
			Choose and apply appropriate statistical methods for solving complex biological problems.
			Reviewing the various bioinformatics tools and their Applications.
			Design real-time solutions by using basic principles of biology, Computer Science and mathematics.
81	System and Network Administrator	16CSE13	Understand a broad range of social networks concepts and theories.
			Appreciate how network analysis can contribute to increasing knowledge about diverse aspects of society.
			Analyze social network links and web search.
			Communicate the analysis results and impact of social networks.
			Differentiate between centralized and decentralized search models.
82	HCI	16CSE19	Understand the structure of models and theories of human computer interaction.
			Understand the vision of a computer user.
			Understand the recognition and remembrance limitations of a computer user.
			Understand the design rules and design process.
			Apply the models and theories of human computer interaction to real-time problems
83	BCT	16CSE21	State the basic concepts of blockchain
			Understand the list of Consensus
			Demonstrate and Interpret working of Hyperledger Fabric, SDK composer tool
			Demonstrate the supply chain.
			Apply to various use cases from different domains
84	Intellectual Property Rights	16MEO04	Will respect intellectual property of others
			Learn the art of understanding IPR

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			Develop the capability of searching the stage of innovations.
			Will be capable of filing a patent document independently.
			Completely understand the techno-legal business angle of IPR and converting creativity into IPR and effectively protect it.
85	History of Science and Technology	16PYO01	Demonstrate knowledge of broad concepts in the history of science, technology ranging over time, space and cultures.
			Recognize the values of a wide range of methodologies, conceptual approaches and the impact of competing narratives within the history of science, technology.
			Identify, locate and analyze relevant primary and secondary sources in order to construct evidence-based arguments.
			Think independently and critically, using appropriate methodologies and technologies to engage with problems in the history of science, technology.
			Demonstrate academic rig our and a sensitivity to cultural and other diversity, and understanding of the ethical implications of historical and scientific enquiry within a global context.

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