M.Tech (CSE) Program

M. Tech Program Outcomes (PO's)

Program Outcomes (POs) describe what students are expected to know or be able to do after completion of the program. For M.Tech (CSE), by considering the Program Educational Objectives, the following four POs are defined in consultation with Course Coordinators and Program Assessment Committee keeping in view department Vision, Mission and PEOs:

PO1: An ability to independently carry out research /investigation and development work to solve practical problems

PO2: An ability to write and present a substantial technical report/document

PO3: Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.

PO4: An ability to pursue higher studies or provide solutions for complex real world problems.

R-23

M.Tech (CSE) - Department Vision

To become a center of excellence in the field of Computer Science and Engineering that produces innovative, skillful, socially responsible and ethical professionals.

M.Tech (CSE) - Department Mission:

1. To provide a curriculum that balances engineering fundamentals, modern technologies and research.
2. To provide opportunities for solving real world problems.
3. To provide opportunities for overall personal and social skill development.

M.Tech (CSE) - Program Education Objectives (PEOs)

The PEOs are to facilitate the graduating students to

1. **PEO 1:** Will be able to practice their profession with confidence and global competitiveness by making intellectual contributions.
2. **PEO 2:** Will pursue a life-long career of personal and professional growth with superior work ethics and character.
3. **PEO 3:** Will be engaged in research leading to innovations/products or become a successful entrepreneur.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Course Outcomes Statements for R23-M.Tech (CSE)

Academic Year 2023-24

Sno	Year / Sem	Name of the Course	
1.	I/I	**23CSC101 - Mathematical Foundation of Computer Science**	
		23CSC101.1	Understand the basic notions of discrete and continuous probability.
		23CSC101.2	Apply the methods of statistical inference, and learn application of sampling distributions in data mining and machine learning.
		23CSC101.3	Apply statistical analysis to algorithmic problems of simple to moderate complexity indifferent domains.
		23CSC101.4	Model different applications of computer science as graph theory problems
2.	I/I	**23CSC102 - Advanced Algorithms**	
		23CSC102.1	Define and discuss the different problems solved by using algorithmic paradigms.
		23CSC102.2	Apply the suitable data structure for solving a problem using various strategies.
		23CSC102.3	Differentiate the complexities of a problem solved in various approaches.
		23CSC102.4	Evaluate various algorithmic design techniques.
		23CSC102.5	Design appropriate mathematical notation to solve a problem using algorithmic paradigms.
		23CSC102.6	Develop solutions for real world problem.
3.	I/I	**23CSE101 - Machine Learning(PE-I)**	
		23CSE101.1	Identify complexity of machine learning algorithms and their limitations.
		23CSE101.2	Recognize the underlying mathematical relationships within and across machine learning algorithms and their paradigms.
		23CSE101.3	Design and implement machine learning solutions to classification, regression, and clustering problems.
		23CSE101.4	Evaluate and interpret the results of the algorithms.
		23CSE101.5	Develop an appreciation for what is involved in learning from data.
		23CSE101.6	Apply graphical models for probabilistic reasoning.
4.	I/I	**23CSE102 - Data Preparation And Analysis(PE-1)**	
		23CSE102.1	Identify and analyze various data gathering and preparation techniques to format, parse and transform data as required.
		23CSE102.2	Apply data cleaning techniques on various data sets to perform consistency check, transformation, and segmentation processes.
		23CSE102.3	Apply exploratory data analysis techniques to perform

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			descriptive and comparative statistics on data.
		23CSE102.4	Analyze different visualization techniques and apply the suitable one to deal with real-world problems.
		23CSE102.5	Apply correlations, connectivity, and interactivity techniques on different data items for any given dataset.
		23CSE102.6	Analyze various statistical significance based testing mechanisms and apply them to build regression models.
5.	I/I	**23CSE103 - Computer Graphics(PE-1)**	
		23CSE103.1	Understand computer graphics system, design algorithms and two-dimensional transformations.
		23CSE103.2	Apply clipping, three-dimensional graphics and three dimensional transformations.
		23CSE103.3	Apply modelling, rendering, shading algorithms
		23CSE103.4	Apply various algorithms to scan, convert the basic geometrical primitives, transformations, area filling, clipping.
		23CSE103.5	Model by mapping computer graphics and geometrical transformation in multidisciplinary field of engineering.
6.	I/I	**23CSE104 - Full Stack Development(PE-1)**	
		23CSE104.1	Understand the database connectivity and application servers.
		23CSE104.2	Explore the type of forms with validations using ReactJS.
		23CSE104.3	Utilize express framework to develop responsive web applications.
		23CSE104.4	Demonstrate the architecture and file system of NodeJS.
		23CSE104.5	Identify the significance of component intercommunication with Angular2
		23CSE104.6	Adapt MEAN or MERN stack to implement a real-time web application.
7.	I/I	**23CSE105 - Software Defined Networks(PE-1)**	
		23CSE105.1	Differentiate between traditional networks and software defined networks.
		23CSE105.2	Understand advanced and emerging networking technologies.
		23CSE105.3	Learn how to use SDN controllers to perform complex networking tasks.
		23CSE105.4	Demonstrate the skills to do advanced networking research and programming.
		23CSE105.5	Apply the knowledge on SDN and security measures to solve real world problems
8.	I/I	**23CSE111 - Artificial Intelligence(PE-1)**	
		23CSE111.1	Describe knowledge of the fundamental principles of intelligent systems.
		23CSE1112	Identify various search strategies to solve problems.
		23CSE111.3	Compare and contrast knowledge representation schemes.

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		23CSE111.4	Appraise knowledge in uncertainty and probabilistic reasoning approaches.
		23CSE111.5	Apply different learning techniques to solve complex problems and understand basic concepts of Natural Language Processing
9.	I/I	**23CSE112 - Data Mining And Data Warehousing(PE-1)**	
		23CSE112.1	Understand the process, issues and challenges of knowledge discovery
		23CSE112.2	Identify and analyze the significance and working of various data preprocessing methods.
		23CSE112.3	Learn the architecture of data warehouse and its implementation through multi-dimensional modeling.
		23CSE112.4	Understand operational database, warehousing and multidimensional need of data base to meet industrial needs.
		23CSE112.5	Explore the concepts of market basket analysis to generate association rules.
		23CSE112.6	Analyze and evaluate the performance of classification and clustering algorithms
10.	I/I	**23CSE113 -Human And Computer Interaction(PE-1)**	
		23CSE113.1	Understand the structure of models and theories of human computer interaction.
		23CSE113.2	Understand the vision of a computer user.
		23CSE113.3	Understand the recognition and remembrance limitations of a computer user.
		23CSE113.4	Understand the mobile ecosystem and use the corresponding tools for mobile design.
		23CSE113.5	Design an interactive web interface on the basis of models studied.
11.	I/I	**23CSE114 - Software Architectures(PE-2)**	
		23CSE114.1	Understand the fundamental concepts and principles of software architecture.
		23CSE114.2	Identify and apply different architectural styles and design patterns.
		23CSE114.3	Evaluate architectural trade-offs and make informed design decisions.
		23CSE114.4	Apply software architecture principles to design and evaluate software systems.
		23CSE114.5	Develop skills in architectural modeling and analysis.
		23CSE114.6	Apply software architecture best practices in real-world scenarios.
12.	I/I	**23CSE115 -Parallel And Distributed Systems(PE-2)**	
		23CSE115.1	Explore the methodologies adopted for parallel and distributed environments.
		23CSE115.2	Analyze the networking aspects of distributed and parallel computing.

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		23CSE115.3	Explore the different performance issues and tasks in parallel and distributed computing.
		23CSE115.4	Tools usage for parallel and distributed computing.
		23CSE115.5	Understanding high performance computing techniques.
		23CSE115.6	Experience in the design, development, and performance analysis of parallel and distributed applications
13.	I/I	**23CSC103 -Research Methodologies In Computer Science and IPR**	
		23CSC103.1	Understand research problem formulation
		23CSC103.2	Design experiments
		23CSC103.3	Analyze research related information
		23CSC103.4	Write papers and thesis, follow research ethics
		23CSC103.5	Use tools for analysis and thesis writing
14.	I/I	**23CSC104 -Advanced Algorithms Lab**	
		23CSC104.1	Identify and apply data structures to various problems
		23CSC104.2	Describe and analyze various advanced algorithms.
		23CSC104.3	Implement various algorithmic design techniques.
		23CSC104.4	Analyze the time complexities of various algorithms
		23CSC104.5	Apply different paradigm on same problem and identifies the computation efficiency of the algorithm.
		23CSC104.6	Design and identify the suitable algorithmic paradigm to solve real world problems
15.	I/I	**23CSE106 -Machine Learning Lab(PE-1)**	
		23CSE106.1	Apply mathematical foundations, algorithmic principles, and computer science theory to the modeling of computer-based systems.
		23CSE106.2	Identify and utilize modern tools that are useful for data analysis.
		23CSE106.3	Recognize and implement various ways of selecting suitable model parameters for different machine learning techniques.
		23CSE106.4	Implement unsupervised learning algorithms.
		23CSE106.5	Implement and evaluate various Machine Learning approaches.
		23CSE106.6	Design and develop solutions to real world problems using ML techniques.
16.	I/I	**23CSE107 -Data Preparation And Analysis Lab(PE-1)**	
		23CSE107.1	Differentiate between numerical and categorical attributes and apply various pre-processing techniques to clean any chosen dataset.
		23CSE107.2	Apply discretization and clustering techniques on pre-processed data.
		23CSE107.3	Apply association rule mining technique to explore relationships among various attributes.
		23CSE107.4	Apply exploratory data analysis techniques to develop meaningful data visualizations.

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		23CSE107.5	Apply various file-processing operations to deal with real-world datasets.
		23CSE107.6	Create applications to deal with interactive datasets suitable to explore the significance of variables
17.	I/I	**23CSE108 -Computer Graphics Lab(PE-1)**	
		23CSE108.1	Understand modern software that is used in current scenario of computer graphics.
		23CSE108.2	Demonstrate the understanding of contemporary graphics hardware.
		23CSE108.3	Create and formulate interactive graphics applications in programming language
		23CSE108.4	Apply program functions to implement graphic primitives API like OpenGL.
		23CSE108.5	Model demonstrate geometrical transformations.
18.	I/I	**23CSE109 -Full Stack Development Lab(PE-1)**	
		23CSE109.1	Prepare database connections with application servers.
		23CSE109.2	Design user interfaces using ReactJS.
		23CSE109.3	Construct strong expertise on express framework to develop responsive web applications.
		23CSE109.4	Create server side applications using Node.js
		23CSE109.5	Develop spa using Angular2.
		23CSE109.6	Invent next culture-shifting web applications.
19.	I/I	**23CSE110 - Software Defined Networks Lab(PE-1)**	
		23CSE110.1	Proficient in installing, configuring and managing SDN controllers such as OpenDaylight, Ryu, or ONOS.
		23CSE110.2	Design and configure SDN network topologies using tools like Mininet or Open vSwitch
		23CSE110.3	Define flow rules, match packets based on different criteria, and program switches to forward traffic according to desired policies
		23CSE110.4	Understand how to dynamically route traffic, prioritize specific types of traffic, and enforce QoS policies using SDN controllers.
		23CSE110.5	Understand How SDN can be Applied To Solve Specific Networking Challenges.
20.	I/I	**23EGA101- English For Research Paper Writing(AC)**	
		23EGA101.1	Improve work performance and efficiency illustrate the nuances of research paper writing and draw conclusions on professional usefulness.
		23EGA101.2	Classify different types of research papers and organize the format and citation of sources.
		23EGA101.3	Explore various formats of APA, MLA and IEEE and set up for writing a research paper.
		23EGA101.4	Draft paragraphs and write theme-based thesis statements in a scientific manner.
		23EGA101.5	Develop an original research paper while acquiring the

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			knowledge of how and where to publish their papers
21.	I/II	**23CEA101-Disaster Mitigation and Management(AC)**	
		23CEA101.1	Analyze and critically examine existing programs in disaster management regarding vulnerability, risk and capacity at different levels.
		23CEA101.2	Understand and choose the appropriate activities and tools and set up priorities to build a coherent and adapted disaster management plan.
		23CEA101.3	Understand various mechanisms and consequences of human induced disasters for the participatory role of engineers in disaster management.
		23CEA101.4	Understand the impact on various elements affected by the disaster and to suggest and apply appropriate measures for the same.
		23CEA101.5	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
22.	I/I	**23EEA101-Sanskrit for Technical Knowledge(AC)**	
		23EEA101.1	Develop passion towards Sanskrit language.
		23EEA101.2	Decipher the latent engineering principles from Sanskrit literature.
		23EEA101.3	Correlates the technological concepts with the ancient Sanskrit history.
		23EEA101.4	Develop knowledge for the technological progress.
		23EEA101.5	Explore the avenue for research in engineering with aid of Sanskrit.
23.	I/I	**23ECA101-Value Education(AC)**	
		23ECA101.1	Gain necessary knowledge for self-development.
		23ECA101.2	Learn the importance of human values and their application in day to day professional life.
		23ECA101.3	Appreciate the need and importance of interpersonal skills for successful career and social life.
		23ECA101.4	Emphasize the role of personal and social responsibility of an individual for all-round growth.
		23ECA101.5	Develop a perspective based on spiritual outlook and respect women, other religious practices, equality, non-violence and universal brotherhood.
24.	I/I	**23EGA102-Constitution of India(AC)**	
		23EGA102.1	Understand the making of the Indian constitution and its features.
		23EGA102.2	Understand the rights of equality, the right of freedom and the right to constitutional remedies.
		23EGA102.3	Have an insight into various organs of governance -

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			composition and functions.
		23EGA102.4	Understand powers and functions of municipalities, panchayats and co-operative societies.
		23EGA102.5	Understand electoral process, special provisions.
25.	I/I	**23ADA101-Pedagogy Studies(AC)**	
		23ADA101.1	Illustrate the pedagogical practices followed by teachers in developing countries both in formal and informal classrooms.
		23ADA101.2	Examine the effectiveness of pedagogical practices.
		23ADA101.3	Understand the concept, characteristics and types of educational research and perspectives of research.
		23ADA101.4	Describe the role of classroom practices, curriculum and barriers to learning.
		23ADA101.5	Understand research gaps and learn the future directions
26.	I/I	**23EGA103-Stress Management by Yoga**	
		23EGA103.1	Understand yoga and its benefits.
		23EGA103.2	Enhance physical strength and flexibility.
		23EGA103.3	Learn to relax and focus.
		23EGA103.4	Relieve physical and mental tension through asanas
		23EGA103.5	Improve work performance and efficiency
27.	I/I	**23EGA104- Personality Development through Life's Enlightenment Skills**	
		23EGA104.1	Develop their personality and achieve their highest goal of life.
		23EGA104.2	Lead the nation and mankind to peace and prosperity.
		23EGA104.3	Practice emotional self-regulation.
		23EGA104.4	Develop a positive approach to work and duties.
		23EGA104.5	Develop a versatile personality.
28.	I/II	**23CSC105- Advanced Databases**	
		23CSC105.1	Explain the need for complex types in databases and their implementation –spatial, object oriented, text and semi structured databases
		23CSC105.2	Do back-of-envelope estimates of I/O operations for different algorithms in query evaluation engine
		23CSC105.3	Compare different types of database-system architectures , replication and fragmentation in distributed and parallel storage systems
		23CSC105.4	Describe different concurrency and commit protocols in distributed databases
		23CSC105.5	Tune data bases for performance, understand spatial indexing techniques and bloom filters
29.	I/II	**23CSC106-Soft Computing**	
		23CSC106.1	Illustrates various soft computing techniques.
		23CSC106.2	Analyze and design various learning models.
		23CSC106.3	Apply the neural network architecture for various real time

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			applications.
		23CSC106.4	Apply approximate reasoning using fuzzy logic.
		23CSC106.5	Analyze and design genetic algorithms in different applications.
		23CSC106.6	Apply soft computing techniques to solve different applications.
30.	I/II	**23CSE 116-Deep Learning(PE-3)**	
		23CSE 116.1	Understand various optimization techniques used in deep learning.
		23CSE 116.2	Analyze various Auto encoders and Regularization Techniques.
		23CSE 116.3	Design and develop various convolution Neural Networks architectures.
		23CSE 116.4	Analyze various RNNs and Encoder Decoder Models.
		23CSE 116.5	Understand the importance of Transformers, GANs and federated learning to develop real-time applications.
		23CSE 116.6	Evaluate the performance of different models for deep neural network training.
31.	I/II	**23CSE 117- Big Data Analytics(PE-3)**	
		23CSE 117.1	Illustrate big data challenges in different domains including social media, transportation, finance and medicine.
		23CSE 117.2	Enumerate and apply the features of Cassandra.
		23CSE 117.3	Design and develop Hadoop and MapReduce programs.
		23CSE 117.4	Perform data analysis using Apache Spark
		23CSE 117.5	Analyze the data analytics process with a case study.
32.	I/II	**23CSE 118-Artificial Intelligence for Robotics(PE-3)**	
		23CSE 118.1	Understand the Observe-Orient Decide-Act (OODA) AI framework
		23CSE 118.2	Analyze the techniques that allow the robot to learn for itself
		23CSE 118.3	Explore object recognition methods
		23CSE 118.4	Illustrate robot navigation
		23CSE 118.5	Analyze robot emotion engine
33.	I/II	**23CSE119-Secure Software Design And Enterprise Computing(PE-3)**	
		23CSE119.1	Differentiate various software vulnerabilities and develop software to process vulnerabilities for an organization.
		23CSE119.2	Evaluate various enterprise application design and development tools and standard practices.
		23CSE119.3	Review techniques for successfully implementing and supporting network services on an enterprise scale and heterogeneous systems environment.
		23CSE119.4	Know essential techniques for reducing and avoiding system and software security problems.
		23CSE119.5	Understand methodologies and tools to design and develop

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			secure software containing minimum vulnerabilities and flaws.
		23CSE119.6	Solve enterprise-scale problems emanating from lapses in security requirements and information system management practices.
34.	I/II	**23CSE120-Advanced Wireless & Mobile Networks(PE-3)**	
		23CSE120.1	Learn About Evolution of 2G,3G,4G and 5G Networks, Its Architecture And Applications
		23CSE120.2	Understand the concepts of Mobile Communication
		23CSE120.3	Understand the concept about wireless networks, protocol stack and standards
		23CSE120.4	Understand and analyze the network layer solutions for Wireless Networks
		23CSE120.5	Have in depth knowledge on internetworking of WLAN and WWAN
		23CSE120.6	Appraise the knowledge on MANETs architecture and its application
35.	I/II	**23CSE126-Natural Language Processing(PE-4)**	
		23CSE126.1	Understand key concepts of NLP linguistics to describe and analyze language.
		23CSE126.2	Understand the data structures and algorithms that are used in NLP.
		23CSE126.3	Illustrate various text representation techniques in NLP.
		23CSE126.4	Classify texts using machine learning and deep learning.
		23CSE126.5	Apply NLP pipe lines to solve real world applications.
36.	I/II	**23CSE127-Advanced Databases (Parallel, Multimedia, Distributed, Nosql)(PE-4)**	
		23CSE127.1	Understand the concept of distributed database and object oriented databases.
		23CSE127.2	Develop temporal relationships with constraints
		23CSE127.3	Gain the knowledge of parallel databases
		23CSE127.4	Understand the design and implement distributed databases.
		23CSE127.5	Understand of modern data processing paradigms such as NOSQL and Map Reduce.
		23CSE127.6	Store and retrieve multimedia data.
37.	I/II	**23CSE128-Virtual, Augmented, Mixed & Extended Reality(PE-4)**	
		23CSE128.1	Describe how VR & AR systems work and list the applications of VR & AR.
		23CSE128.2	Understand and analyse the hardware requirements of VR & AR.
		23CSE128.3	Identify and use the VR & AR software technologies.
		23CSE128.4	Analyse and understand the working of various state of the art AR devices
		23CSE128.5	Acquire knowledge of mixed reality

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	I/II	**23CSE129-Block Chain Technology(PE-4)**	
		23CSE129.1	Understand the fundamental design and architectural primitives of Blockchain and consensus protocols.
		23CSE129.2	Explore various blockchain platforms and identify the significance of smart contracts.
		23CSE129.3	Identify the working of Ethereum and decentralized applications.
		23CSE129.4	Implement the blockchain applications with Hyperledger Fabric and Composer.
		23CSE129.5	Apply blockchain in different application domains such as financial and supply chain sectors.
		23CSE129.6	Analyze the implications of blockchain for privacy and security.
39.	I/II	**23CS E130-Parallel And High Performance Computing(PE-4)**	
		23CS E130.1	Understand the concepts various levels of parallelisms, GPU programming models and, HPC ecosystems.
		23CS E130.2	Identify the performance limits and profiling of computer programs
		23CS E130.3	Analyse the complexities of parallel algorithms.
		23CS E130.4	Develop parallel applications using OpenMP.
		23CS E130.5	List tools and resources for better coding
40.	I/II	**23CSC107-Advanced Databases And Soft Computing Lab**	
		23CSC107.1	Develop database applications in object relational database concepts
		23CSC107.2	Develop database application using hybernet frame work
		23CSC107.3	Implement data processing applications using Hadoop and map reducing framework
		23CSC107.4	Apply perceptron learning algorithm for a given problem.
		23CSC107.5	Design and analyze various Neural Networks Architectures.
		23CSC107.6	Apply soft computing strategies for various real time applications
41.	I/II	**23CSE121-Deep Learning Lab(PE-3)**	
		23CSE121.1	Evaluate the performance various optimization techniques used in deep learning.
		23CSE121.2	Analyze various auto encoders and Regularization Techniques.
		23CSE121.3	Design and develop various Convolution Neural Networks architectures.
		23CSE121.4	Analyze various RNNs and Encoder Decoder Models.
		23CSE121.5	Understand the importance of transformers and GANs to develop real-time applications.
		23CSE121.6	Evaluate the performance of different models for deep neural network training.
42.	I/II	**23CSE122-Big Data Analytics Lab(PE-3)**	

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		23CSE122.1	Identify the key issues in big data management and experiment with the Hadoop framework.
		23CSE122.2	Develop problem solving and critical thinking skills in fundamental enable techniques like Hadoop & MapReduce. Construct and explain with structure and unstructured data by using NoSQL commands.
		23CSE122.3	Implement fundamental enabling techniques and scalable algorithms for data stream mining.
		23CSE122.4	Implement scientific computing algorithms for finding similar items and clustering.
		23CSE122.5	Analyze the algorithms of big data analytics in various applications like recommender systems, social media applications.
43.	I/II	**23CSE123-Artificial Intelligence For Robotics Lab(PE-3)**	
		23CSE123.1	Identify the key issues robot programming
		23CSE123.2	Develop problem solving and critical thinking skills to build AI enabled robots.
		23CSE123.3	Implement object recognition methods
		23CSE123.4	Implement toy pick-up robot and voice command response robot
		23CSE123.5	Analyze the human emotion-model
44.	I/II	**23CSE124-Secure Software Design And Enterprise Computing Lab(PE-3)**	
		23CSE124.1	Develop a security model for any enterprise-based application on its threats and vulnerabilities.
		23CSE124.2	Implement methodologies and tools to design secure software enterprise application.
		23CSE124.3	Compare different types of threats and attacks.
		23CSE124.4	Implement the various security algorithms to be implemented for secured computing and computer networks.
		23CSE124.5	Evaluate various methods of authentication and access control for web-based applications.
		23CSE124.6	Analyse and apply different anti-intrusion techniques.
45.	I/II	**23CSE125-Advance Wireless And Mobile Networks Lab(PE-3)**	
		23CSE125.1	Identify the different types of Wireless modules and equipment.
		23CSE125.2	Design and demonstrate Wireless network topologies
		23CSE125.3	Practice the basic network commands like AT in GSM
		23CSE125.4	Analyse the network traffic in various Network Simulators Or Emulators
		23CSE125.5	Design and develop wireless wide area networks
		23CSE125.6	Design a Mobile Ad Hoc Network(MANET) and analyse the application of MANET
46.	I/II	**23CSC108-Mini Project with Seminar**	
		23CSC108.1	Identify unsolved problems in domain space.

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		23CSC108.2	Demonstrate team work and sound theoretical knowledge on the problem context.
		23CSC108.3	Analyse the problem with existing solutions and finalize the scope.
		23CSC108.4	Design an optimized solution with flexible architecture to support future functionalities.
		23CSC108.5	Demonstrate the knowledge, skills, and attitudes of a professional engineer.
47.	II/I	**23CSC109-Distributed And Cloud Computing**	
		23CSC109.1	Designing and evaluation of algorithms and protocols for various distributed systems
		23CSC109.2	Articulate the main concepts, key technologies, strengths and limitations of cloud computing.
		23CSC109.3	Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.
		23CSC109.4	Explain the core issues of cloud computing such as resource management and security.
		23CSC109.5	Choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.
		23CSC109.6	Establish own cloud environment using openstack and work on it.
48.	II/I	**23CSE131-Computer Vision(PE-5)**	
		23CSE131.1	Understand the basic principles of image processing and its significance in real world.
		23CSE131.2	Interpret and evaluate various approaches for image. Transformation, segmentation, and restoration.
		23CSE131.3	Identify object, scene recognition and categorization algorithms for real time images.
		23CSE131.4	Analyze images and videos for problems such as tracking and structure from motion.
		23CSE131.5	Apply recovery of 3D structure of ill-posed scenes.
		23CSE131.6	Model various techniques to build computer vision applications.
49.	II/I	**23CSE132-Cloud IOT(PE-5)**	
		23CSE132.1	Understand the basics of IOT, cloud features and their technologies.
		23CSE132.2	Analyze the networking and analyzing protocols
		23CSE132.3	Explore and store the IOT data in webservers and cloud
		23CSE132.4	Illustration of IOT integration with cloud in various fields
		23CSE132.5	Pertain the knowledge of advancements in cloud with IOT
50.	II/I	**23CSE133-Game Design & Development(PE-5)**	
		23CSE133.1	Explore various aspects of game design, including level design and user experience.
		23CSE133.2	Collaborate effectively in game development teams.

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		23CSE133.3	Apply critical thinking and problem-solving skills to game development challenges.
		23CSE133.4	Develop an understanding of the game market and industry trends.
51.	II/I	**23CSE134-Design Patterns(PE-5)**	
		23CSE134.1	Understand software designs that are scalable and easily maintainable
		23CSE134.2	Implement creational design patterns in software design for class instantiation
		23CSE134.3	Analyze structural design patterns for better class and object composition
		23CSE134.4	Use behavioural patterns for better organization and communication between the objects
		23CSE134.5	Applying refactoring to better organize the class responsibilities of current code
52.	II/I	**23cse135-Cyber Security(PE-5)**	
		23CSE135.1	List the different types of cybercrimes and analyze legal frameworks to handle cybercrimes.
		23CSE135.2	Discuss the cyber offence and vulnerabilities in programming languages.
		23CSE135.3	Identify the tools and methods used in cybercrimes.
		23CSE135.4	Analyze and resolve cyber security issues and laws governing Cyberspace.
		23CSE135.5	Describe the need of Digital Forensics and the importance of digital evidence in prosecution.
		23CSE135.6	Interpret the commercial activities in the event of significant information security incidents in the organization.
53.	II/I	**23CSO101-Business Analytics(OE)**	
		23CSO101.1	Identify and describe complex business problems in terms of analytical models.
		23CSO101.2	Apply Appropriate Analytical Methods To Find Solutions To Business Problems That Achieve Stated objectives.
		23CSO101.3	Interpret various metrics, measures used in business analytics
		23CSO101.4	Illustrate various descriptive, predictive and prescriptive methods and techniques.
		23CSO101.5	Model the business data using various business analytical methods and techniques.
		23CSO101.6	Create viable solutions to decision making problems.
54.	II/I	**23MEO101 - Industrial Safety(OE)**	
		23MEO101.1	Identify the causes for industrial accidents and suggest preventive measures.
		23MEO101.2	Identify the basic tools and requirements of different maintenance procedures.
		23MEO101.3	Apply different techniques to reduce and prevent wear and

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			corrosion in industry.
		23MEO101.4	Identify different types of faults present in various equipment's like machine tools, IC Engines, boilers etc.
		23MEO101.5	Apply periodic and preventive maintenance techniques as required for industrial equipment like motors, pumps and air compressors and machine tools etc.
55.	II/I	**23MEO102-Introduction To Optimization Techniques(OE)**	
		23MEO102.1	Formulate a linear programming problems (LPP)
		23MEO102.2	Build and solve Transportation Models And Assignment Models.
		23MEO102.3	Apply project management techniques like CPM and PERT to plan and execute project successfully
		23MEO102.4	Apply queuing and inventory concepts in industrial applications
		23MEO102.5	Apply sequencing models in industries
56.	II/I	**23MEO103-Composite Materials(OE)**	
		23MEO103.1	Classify and characterize the composite materials.
		23MEO103.2	Describe types of reinforcements and their properties.
		23MEO103.3	Understand different fabrication methods of metal matrix composites.
		23MEO103.4	Understand different fabrication methods of polymer matrix composites
		23MEO103.5	Decide the failure of composite materials.
57.	II/I	**23MEO104-Alternative Energy Sources(OE)**	
		23MEO104.1	Understand the need for renewable energy sources in the context of environmental issues.
		23MEO104.2	Apply the principles of solar energy for domestic and industrial usages.
		23MEO104.3	Understand the working principle of wind power plants along with merits and demerits.
		23MEO104.4	Describe the concepts of geothermal energy sources and biomass as a source of energy.
		23MEO104.5	Explain the principles and impact of wave, tidal and OTEC plants on the environment.
58.	II/I	**23MEO105-Computational Methods(OE)**	
		23MEO105.1	Derive CFD governing equations and turbulence models.
		23MEO105.2	Apply different PDEs and know the importance of Taylor series of expansion.
		23MEO105.3	Solve simultaneous linear equations with various methods.
		23MEO105.4	Understand errors, stability, consistency and develop O,H and C grid generated models.
		23MEO105.5	Utilize FVM for heat transfer problems.
59.	II/I	**23CEO101-Cost Management Of Engineering Projects(OE)**	
		23CEO101.1	Acquire in-depth knowledge about the concepts of project management and understand the principles of project

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			management.
		23CEO101.2	Determine the critical path of a typical project using CPM and PERT techniques.
		23CEO101.3	Prepare a work break down plan and perform linear scheduling using various methods.
		23CEO101.4	Solve problems of resource scheduling and leveling using network diagrams.
		23CEO101.5	Learn the concepts of budgetary control and apply quantitative techniques for optimizing project cost.
60.	II/I	**23EEO101-Waste To Energy(OE)**	
		23EEO101.1	Understand the concept of conservation of waste.
		23EEO101.2	Identify the different forms of wastage.
		23EEO101.3	Choose the best way for conservation to produce energy from waste.
		23EEO101.4	Explore the ways and means of combustion of biomass.
		23EEO101.5	Develop a healthy environment for the mankind.
61.	II/I	**23PYO101-History of Science and Technology(OE)**	
		23PYO101.1	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.
		23PYO101.2	Illustrate the advancements in science and technology in the medieval period across Asia and Arab countries and decline and revival of science in Europe.
		23PYO101.3	Explain the scientific approach and its advances of the Europeans and how the role of engineer during the industrial revolution and the major advancements.
		23PYO101.4	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.
		23PYO101.5	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.
62.	II/I	**23CSC110-Dissertation Phase-I**	
		23CSC110.1	Inculcate the culture of self-learning on various topics
		23CSC110.2	Review literature such as books, journal, technical documents related to problem specific domain
		23CSC110.3	Analyze the complex real world problems
		23CSC110.4	Formulate the solutions using the appropriate methodology
		23CSC 110.5	Design and represent solutions using the appropriate design diagrams
		23CSC 110.6	Develop research culture, communicate with engineers and the community at large in written an oral forms.
63.	II/II	**23CSC111-Dissertation Phase-II**	
		23CSC111.1	Use different experimentation techniques and technologies

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		23CSC111.2	Develop experimental set up/ environment test rig
		23CSC111.3	Conduct experiments by using the benchmark data sets
		23CSC111.4	Analyze and interpret the results by using appropriate modern tools
		23CSC111.5	Communicate effectively with technical reports and oral presentation
		23CSC111.6	Make research contributions by publishing their work to the research community

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