Department of Computer Engineering

SY B. TECH

Semester III Course Outcomes

DJ19CEC301 & DJ19CET301 - Engineering Mathematics III

Learners will be able to:	
DJ19CEC301.1	Use Laplace and inverse Laplace Transform to the Ordinary Differential Equations.
DJ19CEC301.2	Expand the periodic function by using Fourier series and complex form of Fourier series.
DJ19CEC301.3	Apply Fourier Transform in the future subjects like signal processing
DJ19CEC301.4	Apply the concept of Z- transformation and its inverse of the given sequence

DJ19CEC302 & DJ19CEL302 - Data Structures

Learners will be able to:	
DJ19CEC302.1	To understand different searching and sorting Techniques.
DJ19CEC302.2	To perform various operations on linear and nonlinear Data structures
DJ19CEC302.3	To implement linear data structures for different applications.
DJ19CEC302.4	To demonstrate use of nonlinear data structures in Various applications
DJ19CEC302.5	To understand and apply various hashing techniques.

DJ19CEC303 & DJ19CET303 - Discrete Structures

Learners will be able to:	
DJ19CEC303.1	Verify the correctness of an argument using propositional and predicate logic and truth tables.
DJ19CEC303.2	Demonstrate the ability to solve problems using counting techniques and combinatorics in the context of discrete probability
DJ19CEC303.3	Solve problems involving recurrence relations and generating functions.
DJ19CEC303.4	Understand relations, Diagraph and lattice, functions.
DJ19CEC303.5	Explain and differentiate graphs and trees.
DJ19CEC303.6	Understand the different Algebraic structures and demonstrate use of groups and codes in Encoding Decoding

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DJ19CEC304 & DJ19CEL304- Database Management Systems

Learners will be able to:	
DJ19CEC304.1	Understand the fundamentals of a database systems
DJ19CEC304.2	Design and draw ER and EER diagram for the real-life problem.
DJ19CEC304.3	Convert conceptual model to relational model and formulate relational algebra queries.
DJ19CEC304.4	Design and query database using SQL.
DJ19CEC304.5	Analyse and apply concepts of normalization to relational database design and to understand the concept of transaction, concurrency and recovery.
DJ19CEC304.6	Understand the concepts of distributed database.

DJ19CEC305 & DJ19CEL305- Digital Electronics

Learners will be able to:	
DJ19CEC305.1	Understand different number systems and their conersion.
DJ19CEC305.2	Analyze and minimize Boolean expressions.
DJ19CEC305.3	Design and analyze combinational circuits.
DJ19CEC305.4	Design and analyze sequential circuits
DJ19CEC305.5	Design and analyze counters and registers.
DJ19CEC305.5	Understand programming logic devices.

DJ19CEL306 - Programming Laboratory-I (Java)

Learners will be able to:	
DJ19CEL306.1	Apply fundamental programming constructs
DJ19CEL306.2	Illustrate the concept of packages, classes and objects.
DJ19CEL306.3	Elaborate the concept of strings, arrays and vectors
DJ19CEL306.4	Implement the concept of inheritance and interfaces
DJ19CEL306.5	Implement the notion of exception handling and multithreading.
DJ19CEL306.6	Develop GUI based application.

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DJ19A1- Innovative Product Development-I

Learners will be able to:	
DJ19A1.1	Identify the requirement for a product based on societal/research needs
DJ19A1.2	Apply knowledge and skills required to solve a societal need by conceptualizing a product, especially while working in a team.
DJ19A1.3	Use standard norms of engineering concepts/practices in the design and development of an innovative product.
DJ19A1.4	Draw proper inferences through theoretical/ experimental/simulations and analyze the impact of the proposed method of design and development of the product.
DJ19A1.5	Develop interpersonal skills, while working as a member of the team or as the leader.
DJ19A1.6	Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, which could eventually prepare themselves to be successful entrepreneurs.
DJ19A1.7	Demonstrate product/project management principles during the design and development work and also excel in written (Technical paper preparation) as well as oral communication.

Sem IV: Course Outcomes

DJ19CEC401 & DJ19CET401- Engineering Mathematics IV

Learners will be able to:	
DJ19CEC401.1	Demonstrate ability to manipulate matrices and compute Eigen values and Eigen vectors. Use matrix algebra with its specific rules to solve the system of linear equation, using concept of Eigen value and Eigen vector to the engineering problems.
DJ19CEC401.2	Apply the concept of probability distribution to the engineering problems.
DJ19CEC401.3	Draw conclusions on population based on large and small samples taken and hence use it to understand data science.
DJ19CEC401.4	Apply the concept of Optimization, Correlation and Regression to the engineering problems.

DJ19CEC402 & DJ19CEL402- Formal language and Automata Theory

Learners will be able to:	
DJ19CEC402.1	Understand basic concepts in automata theory and theory of computation.
DJ19CEC402.2	Identify different formal language classes and their relationships
DJ19CEC402.3	Design grammars and recognizers for different formal languages.
DJ19CEC402.4	Prove or disprove theorems in automata theory using its properties.
DJ19CEC402.5	Determine the decidability and intractability of computational problems.

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DJ19CEC403 & DJ19CEL403 - Operating System

Learners will be able to:	
DJ19CEC403.1	Understand basic functions of Operating System
DJ19CEC403.2	Apply and evaluate process scheduling algorithms and IPC
DJ19CEC403.3	Analyze various memory management techniques
DJ19CEC403.4	Understand and interpret File and I/O management techniques
DJ19CEC403.5	Discover functionalities of different operating systems

DJ19CEC404 & DJ19CEL404 - Analysis of Algorithms

Learners will be able to:	
DJ19CEC404.1	Analyze time and space complexity of an algorithm.
DJ19CEC404.2	Apply divide and conquer strategy to solve problems
DJ19CEC404.3	Apply the concept of dynamic programming and Greedy method to solve problems
DJ19CEC404.4	Understand the concepts of backtracking, and string-matching algorithms.
DJ19CEC404.5	Apply the concept of linear programming to optimize the solution

DJ19CEC405 & DJ19CEL405 - Computer Networks

Learners will be able to:	
DJ19CEC405.1	Demonstrate the concepts of data communication at physical layer and compare ISO - OSI model & TCP/IP model
DJ19CEC405.2	Demonstrate the working of networking protocols at data link layer.
DJ19CEC405.3	Design of network using given IP addressing and subnetting / supernetting schemes.
DJ19CEC405.4	Compare and analyze the performance of various routing protocols.
DJ19CEC405.5	Compare and analyze the transport layer protocols and various congestion control algorithms.
DJ19CEC404.6	Explore various protocols at the application layer.

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DJ19CEL405: Programming Laboratory-II (Web Design)

Learners will be able to:	
DJ19CEC405.1	Implement interactive web page(s) using HTML5, CSS3 and JavaScript.
DJ19CEC405.2	Design Web Applications using Typescript.
DJ19CEC405.3	Implement Single Page Applications using Angular, React.js and Node.js Framework.
DJ19CEC405.4	Create REST Web services using MongoDB.

DJ19A4: Innovative Product Development-II

Learners will be able to:	
DJ19A4.1	Identify the requirement for a product based on societal/research needs.
DJ19A4.2	Apply knowledge and skills required to solve a societal need by conceptualizing a product, especially while working in a team
DJ19A4.3	Use standard norms of engineering concepts/practices in the design and development of an innovative product.
DJ19A4.4	Draw proper inferences through theoretical/ experimental/simulations and analyze the impact of the proposed method of design and development of the product.
DJ19A4.5	Develop interpersonal skills, while working as a member of the team or as the leader..
DJ19A4.6	Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, which could eventually prepare themselves to be successful entrepreneurs.

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Semester V Course outcomes

DJ19CEC501 & DJ19CEL501 - Data Mining and Warehouse

Learners will be able to:	
DJ19CEC501.1	Understand Data Warehouse fundamentals and data mining principles..
DJ19CEC501.2	Design data warehouse with dimensional modelling.
DJ19CEC501.3	Understand ETL process and apply OLAP operations
DJ19CEC501.4	Apply appropriate pre-processing techniques.
DJ19CEC501.5	Identify appropriate data mining algorithms to solve real world problems
DJ19CEC501.6	Compare and evaluate different data mining techniques like classification, clustering andassociation rule mining

DJ19CEC502 & DJ19CEL502 - Processor Organization and Architecture

Learners will be able to:	
DJ19CEC502.1	Understand the arithmetic and logic algorithms for processors.
DJ19CEC502.2	Understand the concepts of memory organization and mapping techniques.
DJ19CEC502.3	Explain, Interpret and implement the instructions and addressing modes of 8086 microprocessor and write assembly and mixed language programs.
DJ19CEC502.4	Understand the architecture and concepts of an 8051 microcontroller.
DJ19CEC502.5	Understand advanced trends and technologies in processor architectures.

DJ19CEC503 & DJ19CEL503 - Artificial Intelligence

Learners will be able to:	
DJ19CEC503.1	Develop a basic understanding of AI building blocks presented in intelligent agents
DJ19CEC503.2	Design appropriate problem solving method for an agent to find a sequence of actions toreach goal state.
DJ19CEC503.3	Analyse various AI approaches to knowledge– intensive problem solving, reasoning and planning.
DJ19CEC503.4	Design models for reasoning with uncertainty as well as different types of learning.
DJ19CEC503.5	Design and develop the AI applications in real world scenario.

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DJ19CEEC5012& DJ19CEEC5012- Advanced Database Management System

Learners will be able to:	
DJ19CEEC5012.1	Discuss new developments in database technology.
DJ19CEEC5012.2	Measure query cost and optimize query execution.
DJ19CEEC5012.3	Design distributed database for better resource management.
DJ19CEEC5012.4	Demonstrate the understanding of the concepts of document-oriented databases.
DJ19CEEC5012.5	Apply appropriate security techniques database systems.
DJ19CEEC5012.6	Implement advanced data models for real life applications

DJ19CEL504- Programming Laboratory –II (Python)

Learners will be able to:	
DJ19CEL504.1	Understand basic and object-oriented concepts, data structure implementation in python.
DJ19CEL504.2	Apply file, directory handling and text processing concepts in python.
DJ19CEL504.3	Apply database connectivity, client-server communication using python..
DJ19CEL504.4	Apply various advance modules of Python for data analysis
DJ19CEL504.5	Develop python-based application (web/Desktop) using django web framework/Tkinter.

DJ19IHL2 - Professional and Business Communication Laboratory

Learners will be able to:	
DJ19IHL2.1	Plan, organize and write technical documents like reports, proposals and research papers in the prescribed format using appropriate language and style with an understanding of ethics in written communication
DJ19IHL2.2	Apply techniques of writing resume, participating in a group discussion and facing interviews
DJ19IHL2.3	Develop interpersonal skills in professional and personal situations
DJ19IHL2.4	Understand the documentation process of meetings and conduct meetings in a professional manner
DJ19IHL2.5	Understand communication across cultures and work ethics
DJ19IHL2.5	Design and deliver effective presentations using Power Point

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TE. Sem VI: Course Outcomes

DJ19CEC601 & DJ19CEL601- Software Engineering

Learners will be able to:	
DJ19CEC601.1	Understand and Demonstrate basic knowledge in Software Engineering
DJ19CEC601.2	Identify requirements, analyse, design and develop the software projects..
DJ19CEC601.3	Plan, schedule and track the progress of the projects
DJ19CEC601.4	Identify risks, manage the configuration and change in software.
DJ19CEC601.5	Apply testing principles on software projects.
DJ19CEC601.6	Apply latest tools and techniques on software projects.

DJ19CEC602 & DJ19CEL602- Advance Algorithm

Learners will be able to:	
DJ19CEC602.1	Analyze the chosen algorithm.
DJ19CEC602.2	Choose appropriate data structure and algorithm for given problem statement.
DJ19CEC602.3	Design the algorithm.

DJ19CEC603 & DJ19CEL603 - Information Security

Learners will be able to:	
DJ19CEC603.1	Understand system security goals and concepts, classical encryption techniques and acquire fundamental knowledge on the concepts of modular arithmetic and number theory.
DJ19CEC603.2	Understand, compare and apply different encryption and decryption techniques to solve problems related to confidentiality and authentication
DJ19CEC603.3	Apply the knowledge of cryptographic checksums and evaluate the performance ofdifferent message digest algorithms for verifying the integrity of varying message sizes
DJ19CEC603.4	Apply different digital signature algorithms to achieve authentication and designsecure applications
DJ19CEC603.5	Understand network security basics, analyze different attacks on networks and systems.
DJ19CEC603.6	Understand Software vulnerability and Apply preventive measures.

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DJ19CEEC6011 & DJ19CEEC6011 - Big Data Infrastructure

Learners will be able to:	
DJ19CEEC6011.1	Describe big data and use cases from selected business domains.
DJ19CEEC6011.2	Perform map-reduce analytics using Hadoop
DJ19CEEC6011.3	Use Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data Analytics
DJ19CEEC6011.4	Build and maintain reliable, scalable, distributed systems using Apache Spark.
DJ19CEEC6011.5	Design and build MongoDB based Big data Applications and learn MongoDB query language.
DJ19CEEC6011.6	Use streaming tools for real time analysis of bigdata.

DJ19CEEC6012 & DJ19CEEL6012: Internet of Things

Learners will be able to:	
DJ19CEEC6012.1	Comprehend the Internet of Things concepts and investigate the challenges.
DJ19CEEC6012.2	Identify machine learning techniques suitable for a given problem
DJ19CEEC6012.3	Develop and deploy IoT system prototype with enhanced IoT Technologies.
DJ19CEEC6012.4	Get hand-on exposure to different IoT processors and controllers
DJ19CEEC6012.5	Use IoT communication models and protocols.
DJ19CEEC6012.6	Design and develop small IoT applications to create smart objects

DJ19CEEC6013& DJ19CEEC6013: Business Analytics

Learners will be able to:	
DJ19CEEC6013.1	Able to familiar with Base SAS programming.
DJ19CEEC6013.2	Understand and demonstrate visual analytics.
DJ19CEEC6013.3	Able to design the report using reporter
DJ19CEEC6013.4	View various reports using different media devices.

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DJ19CEEC6021& DJ19CEEL6021: Machine Learning

Learners will be able to:	
DJ19CEEC6021.1	Gain knowledge about basic concepts of Machine Learning
DJ19CEEC6021.2	Identify machine learning techniques suitable for a given problem
DJ19CEEC6021.3	Apply Dimensionality reduction techniques.
DJ19CEEC6021.4	Solve the problems using various machine learning techniques
DJ19CEEC6021.5	Understand the basics of Reinforcement and deep learning.
DJ19CEEC6021.6	Design application using machine learning techniques

DJ19CEEC6022 & DJ19CEEL6022: Compiler Design

Learners will be able to:	
DJ19CEEC6022.1	Understand the basics of compilation steps.
DJ19CEEC6022.2	Apply knowledge of automata theory and formal languages.
DJ19CEEC6022.3	Understand and Implement a Parser.
DJ19CEEC6022.4	Describe techniques for intermediate code and machine code optimization.
DJ19CEEC6022.5	Apply various Error Recovery mechanisms

DJ19CEEC6023 & DJ19CEEL6023 - Human Machine Interaction

Learners will be able to:	
DJ19CEEC6023.1.	Identify User Interface (UI) design principles.
DJ19CEEC6023.2	Analysis of effective user friendly interfaces
DJ19CEEC6023.3	Apply Interactive Design process in real world applications.
DJ19CEEC6023.4	Evaluate UI design and justify
DJ19CEEC6023.5	Create application for social and technical task.

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DJ19ILL2: Innovative Product Development-IV

Learners will be able to:	
DJ19ILL2**:**1	Identify the requirement for a product based on societal/research needs
DJ19ILL2.2	Apply knowledge and skills required to solve a societal need by conceptualising a product, especially while working in a team
DJ19ILL2.3	Use standard norms of engineering concepts/practices in the design and development ofan innovative product.
DJ19ILL2.4	Draw proper inferences through theoretical/ experimental/simulations and analyse theimpact of the proposed method of design and development of the product.
DJ19ILL2.5	Develop interpersonal skills, while working as a member of theteam or as theleader.
DJ19ILL2.6	Demonstrate capabilities of self-learning as part of the team, leading to life-long learning,which could eventually prepare themselves to be successful entrepreneurs.

DJ19A5- Environmental Studies

Learners will be able to:	
DJ19A5.1.	Understand how human activities affect environment
DJ19A5.2	Understand the various technology options that can make a difference

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B.Y B. TECH

Sem VII Course Outcomes

DJ19CEC701 & DJ19CEL701 - Digital Signal Processing and Applications

Learners will be able to:	
DJ19CEC701.1	Understand concept of digital signal processing and applications
DJ19CEC701.2	Classify and analyze discrete time signals and systems
DJ19CEC701.3	Apply the efficient computing algorithms of DFT and FFT in finding the response of thesystem
DJ19CEC701.4	Use the enhancement techniques for digital Image Processing
DJ19CEC701.5	Apply digital image processing techniques for edge detection

DJ19CEC702 & DJ19CEL702 - Distributed Computing

Learners will be able to:	
DJ19CEC702.1	Demonstrate knowledge of the basic elements and concepts related to distributed systemtechnologies
DJ19CEC702.2	Illustrate the middleware technologies that support distributed applications such as RPC,RMI and Object based middleware.
DJ19CEC702.3	Analyse the various techniques used for clock synchronization and mutual exclusion
DJ19CEC702.4	Demonstrate the concepts of Resource and Process management and synchronization algorithms
DJ19CEC702.5	Demonstrate the concepts of Consistency and Replication Management
DJ19CEC702.6	Apply the knowledge of Distributed File System to analyse various file systems like NFS, AFS and the experience in building large-scale distributed applications.

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DJ19CEEC7011 & DJ19CEEL7011 - Deep Learning

Learners will be able to:	
DJ19CEEC7011.1	Understand and Apply Hyper parameters Tuning
DJ19CEEC7011.2	Interpret working of deep learning models
DJ19CEEC7011.3	Create Deep learning Models for real-world problems
DJ19CEEC7011.4	Investigate suitable deep learning algorithms for various applications.

DJ19CEEC7012 & DJ19CEEL7012 - Blockchain Technology

Learners will be able to:	
DJ19CEEC7012.1	Acquire basic knowledge of Blockchain technology and Analyze various algorithmsused in Blockchain.
DJ19CEEC7012.2	Introduce about cryptocurrency and various regulations.
DJ19CEEC7012.3	Aware of privacy and security issues and applications in Blockchain
DJ19CEEC7012.4	Design and understand various applications using Blockchain and Distributed Foundation and case studies.

DJ19CEEC7013 & DJ19CEEL7013- Predictive Modelling

Learners will be able to:	
DJ19CEEC7013.1	Understand the process of formulating business objectives, data selection/collection,preparation and process to successfully design, build, evaluate and implement predictive models for a various business application
DJ19CEEC7013.2	Compare the underlying predictive modeling techniques. Compare the underlying predictive modeling techniques.
DJ19CEEC7013.3	Apply statistical analysis to wide range of problems such as decision tree
DJ19CEEC7013.4	Implement neural network and regression in predictive modeling

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B.Y B. TECH

Sem VIII Course

OutcomesDJ19CEC801 & DJ19CEL801- Web Intelligence

Learners will be able to:	
DJ19CEC801.1	Interpret the terminologies and perspectives of Web Mining.
DJ19CEC801.2	Perform social network analysis to identify communities and network properties in social media sites.
DJ19CEC801.3	Extract and Integrate information from the web for real-world scenarios.
DJ19CEC801.4	Design new solutions to opinion extraction and sentiment classification problems
DJ19CEC801.5	Provide solutions to the emerging problems with social media using Recommendationsystems

DJ19CEC802 & DJ19CEL802- High Performance Computing

Learners will be able to:	
DJ19CEC802.1	Comprehend fundamental concepts parallel processing approaches
DJ19CEC802.2	Describe different parallel processing platforms involved in achieving High Performance Computing.
DJ19CEC802.3	Discuss different design issues in parallel programming
DJ19CEC802.4	Develop efficient and high-performance parallel programming.
DJ19CEC802.5	Learn parallel programming using message passing paradigm using open-source APIsand shared address space platforms.

DJ19CEEC8011 & DJ19CEEL8011- Natural Language Processing

Learners will be able to:	
DJ19CEEC8011.1	Understand the principles and Process the Human Languages Such as English andother Indian Languages using computers
DJ19CEEC8011.2	Creating CORPUS linguistics based on digestive approach (Text Corpus method)
DJ19CEEC8011.3	Demonstrate understanding of state-of-the-art algorithms and techniques for text-based processing of natural language with respect to morphology.
DJ19CEEC8011.4	Perform POS tagging for a given natural language and select a suitable language modelling technique based on the structure of the language.
DJ19CEEC8011.5	Check the syntactic and semantic correctness of sentences using grammars and labelling.
DJ19CEEC8011.6	Develop Computational Methods for Real World Applications and explore deep learning based NLP

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DJ19CEEC8012 & DJ19CEEL8012- Software Architecture

Learners will be able to:	
DJ19CEEC8012.1	Specify and evaluate software architectures.
DJ19CEEC8012.2	Select and use appropriate architectural styles.
DJ19CEEC8012.3	Select and use appropriate software design patterns.
DJ19CEEC8012.4	Understand and perform a design review with agile project architecture.

DJ19CEEC8013 & DJ19CEEL8013- Software Testing and Quality Assurance

Learners will be able to:	
DJ19CEEC8013.1	Use various Software testing techniques to produce quality software.
DJ19CEEC8013.2	Identify Learn Life-cycle models for requirements.
DJ19CEEC8013.3	Design process models for units, integration, system, and acceptance testing
DJ19CEEC8013.4	Identify various Quality Models.

DJ19ILO8028 - Digital Marketing Management

Learners will be able to:	
DJ19ILO8028.1	Understand the digital marketing framework & model and consumer behaviour.
DJ19ILO8028.2	Develop digital marketing strategy roadmap.
DJ19ILO8028.3	Explain the terminology and concepts for developing web-specific media plans.
DJ19ILO8027.4	Understand concepts related to digital campaign management and revenue generationmodels.
DJ19ILO8028.5	Get a perspective on global digital marketing technology/tools and future trends.

DJ19ILO8029 - Environmental Management

Learners will be able to:	
DJ19ILO8029.1	Identify Environmental issues and get familiarized to the concept of Ecosystem and environmental management.
DJ19ILO8029.2	Know policies and legal aspects and understand EM system standards.
DJ19ILO8029.3	Understand Environment Impact assessment.
DJ19ILO8029.4	Understand Environment Auditing procedures.
DJ19ILO8029.5	Describe Environmental management Techniques

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DJ19ILO8030 - Labour and Corporate Law

Learners will be able to:	
DJ19ILO8030.1	Illustrate the role of trade union in the industrial setup
DJ19ILO8030.2	Understand the important causes, impact of industrial disputes and settlement procedures.
DJ19ILO8030.3	To provide in-depth understanding of corporate social responsibility.
DJ19ILO8030.4	Apply concepts, principles and theories to understand simple business laws.
DJ19ILO8030.5	Analyse the principle of international business and strategies adopted by firms to expand globally

Department of Computer Engineering

F.Y M. TECH
Sem I Course Outcomes

DJS22CPGC101 & DJS22CEPGL101- Probability and Statistics

Learners will be able to:	
DJS22CPGC101.1	Understand the basic notions of discrete and continuous probability.
DJS22CPGC101.2	Understand the statistical measures in sampling estimation
DJS22CPGC101.3	Apply testing of hypothesis which will be useful in solving Engineering problems. solve computing problems
DJS22CPGC101.4	Apply the concept of multivariate analysis in solving Engineering problems.
DJS22CPGC101.5	Create correlation analysis using different analysis techniques.
DJS22CPGC101.6	Analyze and forecasting of time-series data.

DJS22CPGC102 & DJS22CPGL102 - Artificial Intelligence and Machine Learning & Artificial Intelligence and Machine Learning Laboratory

Learners will be able to:	
DJS22CPGC102.1	Identify Machine Learning techniques suitable for a given problem
DJS22CPGC102.2	Design and develop the AI applications in real world scenario.
DJS22CPGC102.3	Interpret working of deep learning models
DJS22CPGC102.4	To understand NLP execution pipeline

DJS22CPGL103 - Skill Based Laboratory 1

Learners will be able to:	
DJS22CPGC103.1	Understand the basic notions of discrete and continuous probability.
DJS22CPGC103.2	Understand the statistical measures in sampling estimation.
DJS22CPGC103.3	Apply testing of hypothesis which will be useful in solving Engineering problems.
DJS22CPGC103.4	Apply the concept of multivariate analysis in solving Engineering problems.
DJS22CPGC103.5	Create correlation analysis using different analysis techniques.
DJS22CPGC103.6	Analyze and forecasting of time-series data.

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DJS22CPGC111- Natural Language Processing

Learners will be able to:	
DJS22CPGC111.1	Design an innovative application using NLP components
DJS22CPGC111.2	Implement probabilistic models for word level analysis of a language
DJS22CPGC111.3	Perform Syntactic and Semantic level analysis of a language
DJS22CPGC111.4	Use the embedding algorithms for NLP applications
DJS22CPGC111.5	Compare and contrast the use of different statistical approaches for different types of NLP applications

DJS22CPGC112- Advanced Computer Network and Design

Learners will be able to:	
DJS22CPGC112.1	Understand IPV6 Protocol and advantages over IPV4
DJS22CPGC112.2	Understand IP multicasting protocols and various TCP techniques
DJS22CPGC112.3	Analyze various congestion control and avoidance techniques.
DJS22CPGC112.4	Understand Ethernet networking and design new networking model.

DJS22CPGC113- Computer Vision

Learners will be able to:	
DJS22CPGC113.1	Identify basic concepts, terminology, theories, models and methods in the field of computer vision.
DJS22CPGC113.2	Describe basic methods of computer vision related to edge detection and detection of other primitives, stereo, motion and object recognition.
DJS22CPGC113.3	Developed the practical skills necessary to build computer vision applications. Data.
DJS22CPGC113.4	To have gained exposure to feature based alignment.
DJS22CPGC113.5	To understand the dense motion estimation.

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DJS22CPGC121- Internet of Things

Learners will be able to:	
DJS22CPGC121.1	Comprehend the Internet of Things concepts and investigate the challenges.
DJS22CPGC121.2	Gain knowledge of sensors and Design WSN.
DJS22CPGC121.3	Develop IoT system prototype with enhanced IoT Technologies.
DJS22CPGC121.4	Use IoT communication models and protocols.
DJS22CPGC121.5	Implement best practices for IoT Security.
DJS22OPGC121.6	Design and develop small IoT applications to create smart objects

DJS22CPGC122- Advanced System Security and Digital Forensics

Learners will be able to:	
DJS22CPGC122.1	Understand cyber-attacks, apply access control policies, and control mechanisms.
DJS22CPGC122.2	Identify malicious code and targeted malicious code.
DJS22CPGC122.3	Detect and counter threats to web applications.
DJS22CPGC122.4	Understand the vulnerabilities of Wi-Fi networks and explore different measures to secure wireless protocols, WLAN and VPN networks
DJS22CPGC122.5	Understand the ethical and legal issues associated with cybercrimes and be able to mitigate impact of crimes with suitable policies l forensics.
DJS22CPGC122.6	Use different forensic tools to acquire and duplicate data from compromised systems and analyse the same.

DJS22CPGC123- Advance Web Technology

Learners will be able to:	
DJS22CPGC123.1	Build simple websites making use of various Node.js features
DJS22CPGC123.2	Build applications using React JS
DJS22CPGC123.3	Design a dynamic web application enabled with database connectivity
DJS22CPGC123.4	Deploy a full-fledged website

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DJS22OPGC131- Data Analytics

Learners will be able to:	
DJS22OPGC131.1	Interpret data using descriptive statistics
DJS22OPGC131.2	Demonstrate sampling distributions and estimate statistical parameters
DJS22OPGC131.3	Develop hypothesis based on data and perform testing using various statistical techniques.
DJS22OPGC131.4	Perform analysis of variance on data
DJS22OPGC131.5	Examine relations between data

DJS22OPGC132- Journey from Intellectual Property to Patenting

Learners will be able to:	
DJS22OPGC132.1	Recognize the crucial role of IP for the purposes of product and technology development
DJS22OPGC132.2	Understand how and when to file a patent
DJS22OPGC132.3	Apply the knowledge to understand the entire ecosystem
DJS22OPGC131.4	Derive value from IP and leverage its value in new product and service development

DJS22OPGC133- Cyber Security and Laws

Learners will be able to:	
DJS22OPGC133.1	Understand the distinct types of cybercrime and security issues E Business.
DJS22OPGC133.2	Analyses distinct types of cyber threats and techniques for security management.
DJS22OPGC133.3	Explore the legal requirements and standards for cyber security in various countries to regulate cyberspace.
DJS22OPGC133.4	Impart the knowledge of Information Technology Act and legal framework of right to privacy, data security and data protection..

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DJS22OPGC134- Agile Frameworks

Learners will be able to:	
DJS22OPGC134.1	Comprehend the Internet of Things concepts and investigate the challenges.
DJS22OPGC134.2	Summarize the concepts of agile practices and business objectives and phases of agile development framework.
DJS22OPGC134.3	Have an exposure on the scaling factors and models to be developed for agile projects.
DJS22OPGC134.4	Acquire knowledge on the agile performance measurement
DJS22OPGC134.5	Develop the product based on agile factors with risk mitigation.
DJS22OPGC134.6	Describe the role of agile in enterprise management and incremental delivery.

DJS22OPGC135- Design of Experiments

Learners will be able to:	
DJS22OPGC135.1	Plan data collection, to turn data into information and to make decisions that lead to appropriate action
DJS22OPGC135.2	Apply the methods taught to real life situations.
DJS22OPGC135.3	Plan, analyze, and interpret the results of experiments.

DJS22OPGC136- Operations Research

Learners will be able to:	
DJS22OPGC136.1	Convert a real-world problem in to a Linear Programming Problem and Interpret the solution obtained using Simplex method or other algorithms.
DJS22OPGC136.2	Understand reasons of formation of queues, classify various queuing systems and Apply performance parameters defined for various queuing systems for decision making in real life situations.
DJS22OPGC136.3	Describe concept of simulation and Apply Monte Carlo Simulation technique to systems such as inventory, queuing and Develop solutions for them.
DJS22OPGC136.4	Explain the need for replacement of components or machines in most economical way and Infer optimal replacement age.
DJS22OPGC136.5	Identify the decision situations which vary with time and Analyse them using principle of dynamic programming to real life situations.

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F.Y M. TECH
Sem II Course Outcomes

DJS22CPGC201 & DJS22CPGL201 - Advanced Algorithm and Complexity & Advanced Algorithm and Complexity Laboratory

Learners will be able to:	
DJS22CPGC201.1	Analyze the correctness and running time of the algorithms that are implemented in several domains.
DJS22CPGC201.2	Apply the algorithms and design techniques to formulate the optimized solution.
DJS22CPGC201.3	Understand and apply various advanced data structures to solve computing problems.
DJS22CPGC201.4	Introduce and practice advanced algorithms and programming techniques necessary for developing sophisticated computer application programs

DJ22CEPGC202 & DJ22CEPGL202 - Reinforcement Learning & Reinforcement Learning Laboratory

Learners will be able to:	
DJ22CEPGC202.1	Understand the basics of reinforcement learning paradigms.
DJ22CEPGC202.2	Learn methods and algorithms for reinforcement learning.
DJ22CEPGC202.3	Implement, Test reinforcement learning algorithms.
DJ22CEPGC202.4	Analyze real-world problems for solutions using reinforcement learning.

DJS22CPGC211 - Recommendation Systems

Learners will be able to:	
DJS22CPGC211.1	Understand the basic concepts of recommender systems
DJS22CPGC211.2	Solve mathematical optimization problems related to recommender systems
DJS22CPGC211.3	Evaluate performance of recommender systems based on various metrics
DJS22CPGC211.4	Implement learning algorithms in recommender systems data sets.
DJS22CPGC211.5	Design and implement a simple recommender system.
DJS22CPGC211.6	Learn about advanced topics and current applications of recommender systems.

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DJS22CPGC212 - Data Storage Technology

Learners will be able to:	
DJS22CPGC212.1	Acquire the basic knowledge of storage and Data center.
DJS22CPGC212.2	Analyze various network and infrastructure used for data storage
DJS22CPGC2121.3	Understand business continuity and various methods of data Back-ups
DJS22CPGC212.4	Introduce storage management and virtualization and storage security.
DJS22CPGC212.5	Differentiate cloud and network storage visualization.

DJS22CPGC213 - Big Data Infrastructure

Learners will be able to:	
DJS22CPGC213.1	Develop problem solving and critical thinking skills in fundamental enabling techniques like Hadoop and Mapreduce in big data analytics
DJS22CPGC213.2	Develop Data management capabilities for large scale data processing by using various bigdata technologies and APIs.
DJS22CPGC213.3	To work and evaluate Data at scale-Working with Big Data
DJS22CPGC213.4	Analysis of statistical data using various analytical tools
DJS22CPGC213.5	Visualize data using various tools

DJS22CPGC221 - Advanced Computing Infrastructure

Learners will be able to:	
DJS22CPGC221.1	Understand the cloud computing fundamentals and its deployment models.
DJS22CPGC221.2	Compare the various techniques and types of virtualization in distributed computing and how this has enabled the development of Cloud Computing.
DJS22CPGC221.3	Describe how the distributed computing environments known as Grids can be built from lower level services.
DJS22CPGC221.4	Explore frameworks and applications in fog computing.
DJS22CPGC221.5	Explain the general principles of Ubiquitous Computing and the key technical and social factors driving the change towards post-desktop paradigms.

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DJS22CPGC222 - Blockchain Technologies

Learners will be able to:	
DJS22CPGC222.1	Acquire the basic knowledge of Blockchain technology
DJS22CPGC222.2	Analyze various algorithms used in Blockchain.
DJS22CPGC222.3	Introduce about cryptocurrency and various regulations.
DJS22CPGC222.4	Aware about privacy and security issues in Blockchain
DJS22CPGC222.5	Design and understand various applications using Blockchain.

DJS22CPGC223 - Secure Coding

Learners will be able to:	
DJS22CPGC223.1	Write secure programs and identify various risk in the software.
DJS22CPGC223.2	Design secure system by threats modeling.
DJS22CPGC223 3.3	Determine appropriate secure access control mechanism and access privileges.
DJS22CPGC223.4	Learn common mistake made while using cryptography and data protection.
DJS22CPGC223.5	Design secure network program.

DJS22OPGC233 - Digital Marketing

Learners will be able to:	
DJS22OPGC233.1	Apply B2B and B2C contexts to plan content marketing.
DJS22OPGC233.2	Develop and measure impact of content that works well for your target audience.
DJS22OPGC233 .3	Manage social media presence, and create effective content for each platform
DJS22OPGC233.4	Optimize search engine presence through on-site and off-site activities, develop target keyword list, optimize website UX and design, and execute a link building campaign.
DJS22OPGC233.5	Create, execute, and optimize an effective Ad campaign. Display and set up advertising works
DJS22OPGC233.6	Create an email marketing strategy, create and execute email campaigns, and measure the results.

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DJS22OPGC234 - Project Management

Learners will be able to:	
DJS22OPGC234.1	Assess a project by establishing a business case and accordingly prepare a project proposal.
DJS22OPGC234.2	Develop a project plan
DJS22OPGC234.3	Identify task inter-dependencies, construct and analyze a network diagram
DJS22OPGC234.4	Monitor and control the performance of the project.
DJS22OPGC234.5	Demonstrate Team work and team spirit and resolve conflicts.

DJS22OPGC236 - Product Life Cycle Management

Learners will be able to:	
DJS22OPGC236.1	Gain knowledge about phases of PLM, PLM strategies and methodology for PLM feasibility study and PDM implementation
DJS22OPGC236.2	Illustrate various approaches and techniques for designing and developing products.
DJS22OPGC236.3	Apply product engineering guidelines / thumb rules in designing products for moulding, machining, sheet metal working etc.
DJS22OPGC236.4	Acquire knowledge in applying virtual product development tools for components, machining and manufacturing plant.

DJS22OPGC235 - Research Methodology

Learners will be able to:	
DJS22OPGC235.1	Prepare a preliminary research design for projects in their subject matter areas
DJS22OPGC235.2	Accurately collect, analyze and report data
DJS22OPGC235.3	Present complex data or situations clearly
DJS22OPGC235.4	Review and analyze research findings

Department of Computer Engineering

F.Y M. TECH SemI Course Outcomes

DJ19CEPGC101 & DJ19CEPGL101- Advanced Algorithm and Complexity

Learners will be able to:	
DJ19CEPGC101.1	Analyze the correctness and running time of the algorithms that are implemented inseveral domains
DJ19CEPGC101.2	Apply the algorithms and design techniques to formulate the optimized solution
DJ19CEPGC101.3	Understand and apply various advanced data structures to solve computing problems
DJ19CEPGC101.4	Introduce and practice advanced algorithms and programming techniques necessary for developing sophisticated computer application programs

DJ19CEPGC102 - Advanced Soft Computing

Learners will be able to:	
DJ19CEPGC102.1	Understand the constituents and characteristics of soft computing.
DJ19CEPGC102.2	Design fuzzy logic controller for various systems.
DJ19CEPGC102.3	Understand and apply fuzzy rough sets.
DJ19CEPGC102.4	Design neural networks for applications using supervised, unsupervised and reinforcement learning.
DJ19CEPGC102.4	Understand and apply hybrid systems to real world problems

DJ19CEPGC103 & DJ19CEPGL103 - Advanced Computer Network and Design

Learners will be able to:	
DJ19CEPGC103.1	Understand IPV6 Protocol and advantages over IPV4
DJ19CEPGC103.2	Understand IP multicasting protocols and various TCP techniques
DJ19CEPGC103.3	Analyze various congestion control and avoidance techniques.
DJ19CEPGC103.4	. Understand Ethernet networking and design new networking model

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DJ19CEPGC104- Internet of Things

Learners will be able to:	
DJ19CEPGC104.1	Comprehend the Internet of Things concepts and investigate the challenges
DJ19CEPGC104.2	Gain knowledge of sensors and Design WSN.
DJ19CEPGC104.3	Develop IoT system prototype with enhanced IoT Technologies
DJ19CEPGC104.4	Use IoT communication models and protocols.
DJ19CEPGC104.5	Implement best practices for IoT Security.
DJ19CEPGC104.6	Design and develop small IoT applications to create smart objects.

DJ19CEPGE101- Ethical Hacking and Digital Forensics

Learners will be able to:	
DJ19CEPGE101.1	Understand the basic concept of ethical hacking and various techniques.
DJ19CEPGE101.2	Apply hacking principles for Windows Operating System.
DJ19CEPGE101.3	Acquire knowledge of network and internet forensics.
DJ19CEPGE101.4	Understand and explore mobile for forensics procedures.
DJ19CEPGE101.5	Understand android mobile forensics
DJ19CEPGE101.6	Investigate and analyze android applications and forensics

DJ19CEPGE102- Big Data Infrastructure

Learners will be able to:	
DJ19CEPGE102.1	Develop problem solving and critical thinking skills in fundamental enablingtechniques like Hadoop and Mapreduce in big data analytics.
DJ19CEPGE102.2	Develop Data management capabilities for large scale data processing by using various bigdata technologies and APIs.
DJ19CEPGE102.3	To work and evaluate Data at scale-Working with Big Data.
DJ19CEPGE102.4	Analysis of statistical data using various analytical tools
DJ19CEPGE102.5	Design and develop cloud based applications with virtualization.

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DJ19CEPGE103- Natural Language Processing

Learners will be able to:	
DJ19CEPGE103.1	Design an innovative application using NLP components.
DJ19CEPGE103.2	Implement a rule based system to tackle morphology/syntax of a language.
DJ19CEPGE103.3	Design a tag set to be used for statistical processing for real-time applications.
DJ19CEPGE103.4	Compare and contrast the use of different statistical approaches for different types ofNLP applications

DJ19OCEC1021- Cyber Security and Laws

Learners will be able to:	
DJ19OCEC1021.1	Understand the concept of cybercrime and its effect on outside world.
DJ19OCEC1021.2	Interpret and apply IT law in various legal issues.
DJ19OCEC1021.3	Distinguish different aspects of cyber law.
DJ19OCEC1021.4	Apply Information Security Standards compliance during software design anddevelopment.

DJ19OCEC1022- System Dynamics

Learners will be able to:	
DJ19OCEC1022.1	Understand the concept of cybercrime and its effect on outside world.
DJ19OCEC1022.2	Demonstrate understanding of system concepts, system thinking and system archetypes
DJ19OCEC1022.3	Demonstrate understanding of sources of system complexity and counterintuitivebehavior.
DJ19OCEC1022.4	Verify and validate selected models.
DJ19OCEC1022.5	Apply system dynamics concepts to real world problems.

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DJ19OCEC1023- Operation Research

Learners will be able to:	
DJ19OCEC1023.1	Convert a real-world problem in to a Linear Programming Problem and Interpret thesolution obtained using Simplex method or other algorithms.
DJ19OCEC1023.2	Understand reasons of formation of queues, Classify various queuing systems andApply performance parameters defined for various queuing systems for decision making in real life situations.
DJ19OCEC1023.3	Describe concept of simulation and Apply Monte Carlo Simulation technique to systems such as inventory, queuing and Develop solutions for them.
DJ19OCEC1023.4	Explain the need for replacement of components or machines in most economical wayand Infer optimal replacement age.
DJ19OCEC1023.5	Identify the decision situations which vary with time and Analyse them using principle of dynamic programming to real life situations.

DJ19OCEC1024- Wavelets

Learners will be able to:	
DJ19OCEC1024.1	Implement multiphase and polyphase representation.
DJ19OCEC1024.2	Classify various wavelet transform and explain importance of it
DJ19OCEC1024.3	Describe Continuous Wavelet Transform (CWT) and Discrete Wavelet Transform (DWT)
DJ19OCEC1023.4	Explain the properties and application of wavelet transform.
DJ19OCEC1024.5	Develop and realize computationally efficient wavelet based algorithms for signal and image processing.

DJ19OCEC1025- Digital Marketing

Learners will be able to:	
DJ19OCEC1025.1	Apply B2B and B2C contexts to plan content marketing
DJ19OCEC1025.2	Develop and measure impact of content that works well for your target audience.
DJ19OCEC1025.3	Manage social media presence, and create effective content for each platform.
DJ19OCEC1025.4	Optimize search engine presence through on-site and off-site activities, develop target keyword list, optimize website UX and design, and execute a link building campaign.
DJ19OCEC1025.5	Create, execute, and optimize an effective Ad campaign. Display and set up advertising works.
DJ19OCEC1025.6	Create an email marketing strategy, create and execute email campaigns, and measure the results.

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F.Y M. TECH

Sem II Course Outcomes

DJ19CEPGC201- High Performance Computing

Learners will be able to:	
DJ19CEPGC201.1	Comprehend the various parallel processing approaches that forms base for high performance computing.
DJ19CEPGC201.2	Design and develop parallel algorithms and programs
DJ19CEPGC201.3	Explore various standard and advanced high-performance computing technologies.
DJ19CEPGC201.4	Analyze the performance measures in high performance computing.

DJ19CEPGC202 & :DJ19CEPGL202 - Secure Coding

Learners will be able to:	
DJ19CEPGC202.1	Demonstrate knowledge of the basic elements and concepts related to distributedsystem technologies
DJ19CEPGC202.2	Illustrate the middleware technologies that support distributed applications such asRPC, RMI and Object based middleware.
DJ19CEPGC202.3	Analyse the various techniques used for clock synchronization and mutual exclusion
DJ19CEPGC202.4	Demonstrate the concepts of Resource and Process management and synchronization algorithms
DJ19CEPGC202.5	Demonstrate the concepts of Consistency and Replication Management

DJ19CEPGC203 & DJ19CEPGL203 - Predictive Analytics

Learners will be able to:	
DJ19CEPGC203.1	Prepare raw data for predictive modeling.
DJ19CEPGC203.2	Apply different models to perform predictive modeling
DJ19CEPGC203.3	Compare different models and asses the best model for prediction.

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DJ19CEPGC204 - Data Storage Technology

Learners will be able to:	
DJ19CEPGC204.1	Acquire the basic knowledge of storage and Data center
DJ19CEPGC204.2	Analyze various network and infrastructure used for data storage.
DJ19CEPGC204.3	Understand business continuity and various methods of data Back-ups.
DJ19CEPGC204.4	Introduce about storage management and virtualization and storage security.
DJ19CEPGC204.5	Differentiate cloud and network storage visualization.

DJ19CEPGE201 - Business Intelligence

Learners will be able to:	
DJ19CEPGE201.1	Understand the characteristics of real world complex business problems
DJ19CEPGE201.2	Know the structure of Adaptive Business Intelligence System
DJ19CEPGE201.3	Analyze different prediction methods and models.
DJ19CEPGE201.4	Analyze different modern optimization techniques.
DJ19CEPGE201.5	Analyze different hybrid systems and adaptability
DJ19CEPGE201.6	Apply adaptive business intelligence in real time environment

DJ19CEPGE201 - Blockchain Technologies

Learners will be able to:	
DJ19CEPGE201.1	Acquire the basic knowledge of Blockchain technology.
DJ19CEPGE201.2	Analyze various algorithms used in Blockchain.
DJ19CEPGE201.3	Introduce about cryptocurrency and various regulations.
DJ19CEPGE201.4	Aware about privacy and security issues in Blockchain.
DJ19CEPGE201.5	Design and understand various applications using Blockchain.

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DJ19OPGC2021 - Project Management

Learners will be able to:	
DJ19OPGC2021.1	Assess a project by establishing a business case and accordingly prepare a projectproposal.
DJ19OPGC2021.2	Develop a project plan
DJ19OPGC2021.3	Identify task inter-dependencies, construct and analyze a network diagram
DJ19OPGC2021.4	Monitorand control the performance of the project.
DJ19OPGC2021.5	Demonstrate Team work and team spirit and resolveconflicts

DJ19OPGC2022- IPR and Patenting

Learners will be able to:	
DJ19OPGC2022.1	Understand Intellectual Property assets
DJ19OPGC2022.2	Assist individuals and organizations in capacity building
DJ19OPGC2022.3	Work for development, promotion, protection, compliance, and enforcement ofIntellectual Property and Patenting

DJ19OPGC2023- Remote Sensing Concepts

Learners will be able to:	
DJ19OPGC2023.1	Comprehend the basics of Remote Sensing
DJ19OPGC2023.2	Describe various Remote Sensing methods and sensors
DJ19OPGC2023.3	Explain various tools used for data extraction in Remote Sensing
DJ19OPGC2023.4	Apply the concepts of Remote Sensing for various applications

DJ19OPGC2024- Product Life Cycle Management

Learners will be able to:	
DJ19OPGC2024.1	Gain knowledge about phases of PLM, PLM strategies and methodology for PLMfeasibility study and PDM implementation.
DJ19OPGC2024.2	Illustrate various approaches and techniques for designing and developing products.
DJ19OPGC2024.3	Apply product engineering guidelines / thumb rules in designing products for moulding, machining, sheet metal working etc.
DJ19OPGC2024.4	Acquire knowledge in applying virtual product development tools for components, machining and manufacturing plant.

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DJ19OPGC2025- Research Methodology

Learners will be able to:	
DJ19OPGC2025.1	Prepare a preliminary research design for projects in their subject matter areas.
DJ19OPGC2025..2	Accurately collect, analyze and report data.
DJ19OPGC2025..3	Present complex data or situations clearly.
DJ19OPGC2025..4	Review and analyze research findings.

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S.E. Semester III: Course Outcomes

DJ19ECC301 & DJ19ECT301 Engineering Mathematics III (Theory and Laboratory)	
After completing the course, Student will be able to:	
DJ19ECC301.1	List the Laplace transform of standard functions. Use the concept of Laplace transform to evaluate real integrals
DJ19ECC301.2	Classify the methods to find Inverse Laplace transform. Use Laplace and Inverse Laplace transform to solve differential equations.
DJ19ECC301.3	Identify orthogonal and orthonormal set of functions. Provide Fourier series expansion of periodic functions and apply it to deduce sum of an infinite series
DJ19ECC301.4	Identify Irrotational and solenoidal functions. Apply Green's, Stoke's and Gauss Divergence theorem to vector integralproblems.
DJ19ECC301.5	Identify and construct analytic functions and Bilinear transforms. Use Analytic function concept to find orthogonal trajectories

DJ19ECC302 & DJ19ECL302 Analog Circuit Design(Theory and Laboratory)	
After completing the course, Student will be able to:	
DJ19ECC 302.1	Describe the working principle of all Analog circuits such as Amplifiers/Power amplifier/Positive and negative feedback amplifiers etc.
DJ19ECC 302.2	Analyse single and multistage amplifiers circuits using BJT/MOSFET's.
DJ19ECC 302.3	Design of Analog Amplifiers circuits using BJT/MOSFET's for the givenspecifications/applications.
DJ19ECC 302.4	Implement different types of amplifiers with different configuration/components with proper justifications for the results.

DJ19ECC303 & DJ19ECL303 Digital System Design and Lab	
After completing the course, Student will be able to:	
DJ19ECC303.1	Compute arithmetic operations on signed binary numbers.
DJ19ECC303.2	Minimize logic expressions using various reduction techniques.
DJ19ECC303.3	Design combinational logic circuits using logic gates.
DJ19ECC303.4	Design flip-flops and use them to realize sequential circuits.
DJ19ECC303.5	Classify different programmable logic devices and design combinational circuits using PLDs.

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DJ19ECL304 & DJ19ECT304 Electrical Network Analysis and Synthesis and Tutorial	
After completing the course, Student will be able to:	
DJ19ECL304.1	Solve complex electrical networks involving dependent and independent sources and network theorems
DJ19ECL304.2	Analyse electrical networks with KCL and KVL network equilibrium equations using Graph theory
DJ19ECL304.3	Evaluate time and frequency domain responses for understanding the behaviour electrical circuits and evaluate various network functions using pole zero diagram
DJ19ECL304.4	Design various Network functions like RC, RL, LC, in Foster I, Foster II ,Cauer I and Cauer II forms.
DJ19ECL304.5	Evaluate various two port network parameters and to design T and Pi network

DJ19ECL305 & DJ19ECT305 Signals and Systems and Lab	
After completing the course, Student will be able to:	
DJ19ECL305.1	Perform mathematical operations on signals to construct complex signals using basic elementary signals.
DJ19ECL305.2	Classify signals and systems on the basis of their properties and analyse their implications in the context of practical signals and systems
DJ19ECL305.3	Represent signals in the time and frequency domain using multiple representations and analyse LTI systems using convolution in the frequency domain.
DJ19ECL305.4	Compute Fourier series/different transforms for a set of well-defined signals from first principles and apply their appropriate properties for a broader class of signals.

DJ19ECL306 Object Oriented Programming Laboratory	
After completing the course, Student will be able to	
DJ19ECL306.1	Recall the fundamental programming constructs.
DJ19ECL306.2	Clarify the concept of classes and objects
DJ19ECL306.3	Use strings, arrays and vectors.
DJ19ECL306.4	Differentiate the concept of inheritance and interfaces.
DJ19ECL306.5	Evaluate the efficiency of exception handling and multithreading.
DJ19ECL306.6	To develop GUI based application.

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DJ19A2 Innovative product development-I	
After completing the course, Student will be able to:	
DJ19A2.1	Conduct a survey of several available literatures.
DJ19A2.2	Demonstrate various approaches to complete a project.
DJ19A2.3	Carry out collaborative project environment by interacting and dividing project workamong team members.
DJ19A2.4	Develop and enhance software/ hardware skills associated with the product design.

DJ19A3 Constitution of India	
After completing the course, Student will be able to:	
DJ19A3.1	Have general knowledge and legal literacy and thereby to take up competitive examinations.
DJ19A3.2	Understand state and central policies, fundamental duties.
DJ19A3.3	Understand Electoral Process, special provisions.
DJ19A3.4	Understand powers and functions of Municipalities, Panchayats and Co- operative Societies.
DJ19A3.5	Understand Engineering ethics and responsibilities of Engineers
DJ19A3.6	Understand Engineering Integrity & Reliability

SEM IV Course Outcomes

DJ19ECC401& DJ19ECT401 Engineering Mathematics IV and Tutorial	
After completing the course, Student will be able to:	
DJ19ECC401.1	Apply theory of probability in identifying and solving relevant problems.
DJ19ECC401.2	Differentiate random variables through the use of cumulative distribution function (CDF), probability density function (PDF), probability mass function (PMF) as well as joint, marginal and conditional CDF, PDF and PMF.
DJ19ECC401.3	Determine the response of a linear time invariant system to random processes.
DJ19ECC401.4	Identify Eigenvalues and Eigenvectors of matrices. Apply Cayley-Hamilton theorem to evaluate function of square matrices. Understand Quadratic forms and its class.
DJ19ECC401.5	Understand the theory of linear algebra and its applications to telecommunication engineering.

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DJ19ECC402 & DJ19ECL402 Analog Communication and Lab	
After completing the course, Student will be able to:	
DJ19ECC402.1	To compare internal and external noise and its effect on communication system.
DJ19ECC402.2	To examine analog modulation and demodulation techniques along with various analog receivers
DJ19ECC402.3	To make use of sampling theorem to analog and digital pulse modulation and demodulation techniques
DJ19ECC402.4	To compare Frequency division and time division multiplexing and demultiplexing techniques for communication system

DJ19ECC403 & DJ19ECL403 Integrated Circuits and Lab	
After completing the course, Student will be able to:	
DJ19ECC 403.1	Describe the physical operation and fabrication process of semiconductor components and integrated circuits using Op-Amp's
DJ19ECC 403.2	Analyse linear and non-linear Op-Amp applications.
DJ19ECC 403.3	Design linear and non-linear applications using Op-Amps, Timers, and special purpose IC's
DJ19ECC 403.4	Implement data converters using Op-amps.

DJ19ECC404 & DJ19ECT404 Electromagnetics and Wave Propagation and Tutorial	
After completing the course, Student will be able to:	
DJ19ECC404.1	Apply the principles of electrostatics and magnetostatics to the solutions of problems relating to field, potential, boundary conditions and energy density
DJ19ECC404.2	Analyze Maxwell's equation in different forms (differential and integral) and apply them to diverse engineering problems
DJ19ECC404.3	Describe time varying fields, propagation of electromagnetic waves in different media and to apply the theory of electromagnetic waves in practical problems
DJ19ECC404.4	Compute the parameters of transmission lines

DJ19ECL405 Python Programming-Laboratory	
After completing the course, Student will be able to:	
DJ19ECL 405.1	Describe various data types in Python
DJ19ECL 405.2	Implement control statements, conditional statements and functions in Python
DJ19ECL 405.3	Carry out file handling operations using Python
DJ19ECL 405.4	Perform various operations using Numpy, Matplotlib and Pandas in Python
DJ19ECL 405.5	Perform various operations on database using python

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DJ19IHC1 & DJ19IHT1 Universal Human Values and Tutorial	
After completing the course, Student will be able to:	
DJ19IHC1.1	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.
DJ19IHC1.2	Become sensitive to their commitment towards what they have understood (human values, human relationship, and human society).
DJ19IHC1.3	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.

DJ19A4 Innovative Product Development-II	
After completing the course, Student will be able to:	
DJ19A4.1	Accomplish project-based learning that allows students to identify and transfer existing ideas into new contexts and applications thereby improving individual grooming.
DJ19A4.2	Present their research in the form of a technical report and thereby improve the technical skills.
DJ19A4.3	Demonstrate the ability to work in teams and manage the conduct of the research study
DJ19A4.4	Integrate different perspectives from relevant disciplines which help them toget internships, jobs and admission for higher studies.

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SEM V Course Outcomes

DJ19ECC501 & DJ19ECL501: Microprocessor & Microcontroller and Lab	
After completing the course, Student will be able to:	
DJ19ECC501.1	Identify hardware components, their functionalities and use relevant software for programming of Microprocessor & Microcontroller based development system.
DJ19ECC501.2	Identify microcontroller functionalities and architecture of 8051.
DJ19ECC501.3	Write programs for 8051 microcontroller based systems with the help of appropriate instruction set & structural programming concept.
DJ19ECC501.4	Interface input/output devices with 8051 microcontrollers for various applications.
DJ19ECC501.5	Identify functionalities and architecture of ARM 7.

DJ19ECC502 & DJ19ECL502 :Digital Signal Processing and Lab	
After completing the course, Student will be able to:	
DJ19ECC502.1	Solve the efficient computing algorithms of DFT and FFT in finding the response of the system.
DJ19ECC502.2	Design Butterworth, Chebyshev types of IIR filters
DJ19ECC502.3	Design Lowpass, Highpass, Banapass, Bandstop types of FIR filters
DJ19ECC502.4	Examine the effects of Poles and Zeros in design of digital filters
DJ19ECC502.5	Classify the architecture of DSP Processors

DJ19ECC503 & DJ19ECL503:Radio Frequency Circuit Design and Lab	
After completing the course, Student will be able to:	
DJ19ECC503.1	Analyse the single and Multiport network using ABCD/ S - parameters
DJ19ECC503.2	Analyse the behaviour of inductor, capacitor and resistor at high frequency
DJ19ECC503.3	Compute the parameters of transmission line (reflection coefficient, VSWR, input impedance) using analytical and graphical (smith chart) methods
DJ19ECC503.4	Design matching network using impedance transformers, tapered lines using analytical and graphical (smith chart) methods
DJ19ECC503.5	Design filters for given specifications using insertion loss and image parameter method

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DJ19ECEC5014 & DJ19ECEL5014: Neural Network & Fuzzy Logic (Theory and Laboratory)	
On completion of the course, learner will be able to:	
DJ19ECEC5014.1	Explain training of Neural Networks using various training rules with consideration of different parameters like overfitting, underfitting,
DJ19ECEC5014.2	Calculate and update the weights of the neural networks to Specify the working andapplications of different types of neural networks.
DJ19ECEC5014.3	Design fuzzy sets for various applications and solve fuzzy set theory problems.
DJ19ECEC5014.4	Design various engineering application using Neural Networks/ Fuzzy Logic.

DJ19ECEC5015 & DJ19ECEL5015: Operating Systems (Theory and Laboratory)	
At the end of this course, students will be able to	
DJ19ECEC5015.1	Understand basic operating system commands, system calls and shell scripts of OS.
DJ19ECEC5015.2	Explain the management policies adopted by processes, memory, File handlingand I/O operations.
DJ19ECEC5015.3	Apply the algorithms used for memory management, CPU scheduling and diskscheduling.
DJ19ECEC5015.4	Apply concepts related to deadlock to solve problems.
DJ19ECEC5015.5	Analyze the functionalities of OS like Unix, Linux and Real Time OperatingSystems

DJ19ECSBC1 & J19ECSBL1 Data Structures and Algorithms and Lab	
At the end of this course, students will be able to:	
DJ19ECSBC1.1	Implement linear data structures using array and linked list.
DJ19ECSBC1.2	Solve problems using non-linear data structures.
DJ19ECSBC1.3	Analyze the performance of sorting and searching algorithms.

DJ19ECSBL2 Database Management System Laboratory (RAS)	
After completing the course, Student will be able to:	
DJ19ECSBL2.1	Design and draw ER and EER diagram for the real-life problem.
DJ19ECSBL2.2	Create and update database and tables with different DDL and DML statements tointegrity constraints.
DJ19ECSBL2.3	Implement and execute queries for performing Aggregate functions, Joints and Viewsand execute sub queries and Correlated sub queries.
DJ19ECSBL2.4	Analyse and apply concepts of normalization to relational database design and to understand the concept of transaction.

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DJ19IHL2:Professional & Business Communication -Laboratory	
After completing the course, Student will be able to:	
DJ19IHL2.1	Plan, organize and write technical documents like reports, proposals and research papers in the prescribed format using appropriate language and style with an understanding of ethics in written communication
DJ19IHL2.2	Apply techniques of writing resume, participating in a group discussion and facing interviews
DJ19IHL2.3	Demonstrate interpersonal skills in professional and personal situations
DJ19IHL2.4	Articulate the documentation process of meetings and conduct meetings ina professional manner
DJ19IHL2.5	Explain communication across cultures and work ethics
DJ19IHL2.6	Design and deliver effective presentations using Power Point

DJ19ILL1 Innovative Product Development III	
Course outcome	CO statement
After completing the course, Student will be able to:	
DJ19ILL1.1	Define problem statement, formulation and solution by reviewing relevant literature
DJ19ILL1.2	Identify alternate approaches to complete a project
DJ19ILL1.3	Apply project management skills by interacting and dividing project work among team members
DJ19ILL1.4	Develop technical, communication, and presentation skills

SEM VI Course Outcomes

DJ19ECC601 & DJ19ECL601: Digital Communication and Lab (MI)	
At the End of this course, learner will be able to:	
DJ19ECC601.1	Understand random variables and random processes of signal.
DJ19ECC601.2	Encode the messages for the given information source and compare various source coding algorithms for the given information source and quantify theaverage information content of it.
DJ19ECC601.3	Apply different error control coding techniques, design encoders for the given specifications.
DJ19ECC601.4	Compare and analyze various modulation techniques on the basis of signal space representation, power spectral density, spectral efficiency andprobability of error
DJ19ECC601.5	Apply appropriate baseband processing and filtering techniques at transmitting and receiving end.

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DJ19ECC602 & DJ19ECL602: Radiating Systems and Lab	
At the end of this course, students will be able to:	
DJ19ECC602.1	Explain and measure basic antenna parameters like radiation pattern, input impedance, gain and polarization.
DJ19ECC602.2	Derive the field equations for the basic radiating elements like linear wireantenna and loop antenna.
DJ19ECC602.3	Design of uniform linear and planar antenna arrays using isotropic and directional Sources.
DJ19ECC602.4	Design regular shape microstrip antennas and aperture antennas.

DJ19ECC603 and DJ19ECL603: Fundamentals of Digital Image Processing	
On completion of the course, learner will be able to:	
DJ19ECC603.1	Interpret the fundamental concepts of a digital image processing system.
DJ19ECC603.2	Analyze images in the frequency domain using DFT, DCT, Hadamardtransform.
DJ19ECC603.3	Evaluate, compare and contrast the techniques for image enhancement, image restoration and morphology.
DJ19ECC603.4	Interpret and apply image segmentation and representation techniques for object recognition.

DJ19ECC604 and DJ19ECL604: Computer Networks and Lab	
At the end of the course, students will be able to	
DJ19ECC604.1	Compare OSI layered architecture with TCP/IP protocol suite and differentiate functions of each layer.
DJ19ECC604.2	Define characteristics of physical media and differentiate among multiplexingtechniques.
DJ19ECC604.3	Understand responsibilities of the data link layer and explain the datalink layer protocols.
DJ19ECC604.4	Design network and subnetwork and list the commands required to carry outinvestigations and troubleshooting.
DJ19ECC604.5	Distinguish transport layer protocols based on application. Report and present the experimental study conducted along with valid conclusions.

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DJ19ECEC6012 and DJ19ECEL6012: Data Compression & Encryption and Lab	
At the end of the course, students will be able to	
DJ19ECEC6012.1	Describe various lossy and lossless compression techniques.
DJ19ECEC6012.2	Apply various compression techniques for compression of text, image, audio and video.
DJ19ECEC6012.3	Describe public and private cryptosystems and network security relatedprotocols.
DJ19ECEC6012.4	Analyze how the basic design criteria for cryptosystems like confusion, diffusion and number theory are used in cryptographic techniques.

DJ19ECEC6014 and DJ19ECEL6014: Artificial Intelligence & Machine Learning and Laboratory	
At the end of the course, students will be able to	
DJ19ECEC6014.1	Choose an appropriate problem solving method for an agent to find a sequence of actions to reach the goal state.
DJ19ECEC6014.2	Analyse the strength and weakness of AI approaches to Knowledge representation, reasoning.
DJ19ECEC6014.3	Apply supervised learning algorithms for real world applications.
DJ19ECEC6014.4	Apply unsupervised learning algorithms for real world applications.

DJ19ECESBL3: Microcontroller & Applications Laboratory	
At the end of the course, students will be able to	
DJ19ECESBL3.1	Understand the detailed architecture of LPC2148 microcontroller,Arduino & R-Pi Board.
DJ19ECESBL3.2	Interface peripheral devices to the LPC2148 microcontroller, Arduino &R-Pi Board.
DJ19ECESBL3.3	Write Assembly language & Embedded C programming formicrocontrollers.
DJ19ECESBL3.4	Implement hardware circuit using Arduino board for given applications.

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DJ19ILL2 Innovative Product Development-IV	
After completing the course, Student will be able to:	
DJ19ILL2.1	Apply engineering knowledge to produce solution of a problemconsidering cultural, social, environmental, and economic factors using appropriate tools and methods
DJ19ILL2.2	Demonstrate the idea of project based learning by Integrating and synthesizing different perspectives of a project from relevant disciplines.
DJ19ILL2.3	Develop an ability to work in teams and manage the conduct of the research study.

DJ19A5: Environmental Engineering	
At the end of the course, students will be able to	
DJ19A5.1	Understand how human activities affect environment.
DJ19A5.2	Understand the various technology options that can make a difference.

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SEM VII Course Outcomes

Mobile Communication System and Lab	
After completing the course, Student will be able to:	
701.1	Classify different types of propagation models. Also analyze various propagation models using Simulink.
701.2	Explain the cellular fundamentals and estimate the coverage and capacity of cellular systems. Also manipulate, simulate a user interface and debugging through MATLAB/Scilab/Python for the cellular concept system design fundamentals
701.3	Illustrate the fundamentals and system architecture of GSM, 2.5G, IS-95 and UMTS.
701.4	Elaborate on the concepts and principles of 4G network deployment and optimization.
701.5	Identify the emerging technologies for upcoming mobile communication systems

DJ19ECC702 and DJ19ECL702: Microwave Engineering and Lab	
At the end of the course, students will be able to	
DJ19ECC702.1	Analyze the signal propagation through guiding media and Microwave Components
DJ19ECC702.2	Perform mathematical analysis of microwave tubes (Amplifiers and Oscillators) based on its operation/working principle.
DJ19ECC702.3	Analyze the Microwave Semiconductor devices
DJ19ECC702.4	Understand various Microwave communication systems.
DJ19ECC702.5	Demonstrate Microwave bench set-up to measure microwave parameter.
DJ19ECC702.6	Simulate microwave component for its Modal Analysis.

DJ19ECSBL5: Industrial Automation- Laboratory	
At the end of this course, students will be able to:	
DJ19ECSBL5.1	Identify basic components of an Industrial automation system.
DJ19ECSBL5.2	Interface the given input/output devices with appropriate PLC module.
DJ19ECSBL5.3	Prepare PLC ladder program for the given application
DJ19ECSBL5.4	Prepare SCADA programming for various Industrial applications.
DJ19ECSBL5.5	Explain distributed control system used in industry for automation.

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DJ19ECEC7011 & DJ19ECEL7011: Radar Engineering and Laboratory	
At the end of this course, students will be able to:	
DJ19ECEL7011.1	Understand generalized concept of Radar & its applications.
DJ19ECEL7011.2	Analyze Radar range equation in real time atmoshpheric condition.
DJ19ECEL7011.3	Identify pulse radar, continuous wave radar and tracking radar for specific application.
DJ19ECEL7011.4	Evaluate the design constraints for transmitter and receiver like atmospheric condition and unwanted objects clutters.
DJ19ECEL7011.5	Understand the basics of mixer, limiter, displays and servomechnisum usedin transmitter/receiver of RADAR.

DJ19ECEC7012 & DJ19ECEL7012: Big Data Analytics and Laboratory	
At the end of this course, students will be able to:	
DJ19ECEC7012. 1	Understand the key issues in big data management and its associated applications for business decisions and strategy
DJ19ECEC7012. 2	Understand and Develop problem solving and critical thinking skills in fundamental enabling techniques like Hadoop and NoSQL in big data analytics
DJ19ECEC7012. 3	Evaluate Big Data processing by using MapReduce
DJ19ECEC7012. 4	Interpret business models and scientific computing paradigms and apply software tools for big data analytics
DJ19ECEC7012. 5	Exploring the capabilities of big data using Apache Spark

DJ19ECSBL4 IoT and Sensor Network Laboratory	
At the end of this course, students will be able to:	
ECSBL4.1	Identify different components of an IoT and Sensor network system.
ECSBL4.2	Designing and affordability of IoT devices.
ECSBL4.3	To explore the Industrial IoT, Industry 4.0, Connected Car applications.
ECSBL4.4	Use Internet of Things for real time applications

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DJ19ECP701: Project Stage –I	
At the end of this course, students will be able to:	
ECP701.1	Apply the technical knowledge gained from previous courses, Identifyproblems and design solutions to solve real-life problems
ECP701.2	Apply project management skills (scheduling work, procuring parts, documenting technical and non-technical details and working within the confined deadline).
ECP701.3	Create technical reports, research paper and present the same to the evaluation authorities

DJ19ILO7011: Product lifecycle Management	
At the end of this course, students will be able to :	
DJ19ILO7011.1	Gain knowledge about phases of PLM, PLM strategies and methodology for PLM feasibility study and PDM implementation.
DJ19ILO7011.2	Illustrate various approaches and techniques for designing and developing products.
DJ19ILO7011.3	Apply product engineering guidelines / thumb rules in designingproducts for moulding, machining, sheet metal working etc.
DJ19ILO7011.4	Acquire knowledge in applying virtual product development tools for components, machining and manufacturing plant

DJ19ILO7012: Management Information System	
At the end of this course, students will be able to :	
DJ19ILO7012.1	Explain how information systems Transform Business.
DJ19ILO7012.2	Identify the impact information systems have on an organization.
DJ19ILO7012.3	Analyze IT infrastructure, its components and current trends.
DJ19ILO7012.4	Understand the principal tools and techniques for accessing information from databases to improve business performance anddecision making.
DJ19ILO7012.4	Illustrate the types of systems used for enterprise-wide knowledge management and how they provide value for businesses

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DJ19ILO7013: Operational Research	
At the end of the course the student will be able to	
DJ19ILO7013.1	Understand the theoretical workings of the simplex method, the relationship between a linear program and its dual, including strong duality and complementary slackness.
DJ19ILO7013.2	Perform sensitivity analysis to determine the direction and magnitude of change of a model's optimal solution as the data change.
DJ19ILO7013.3	Solve specialized linear programming problems like the transportation and assignment problems, solve network models like the shortest path, minimum spanning tree, and maximum flow problems.
DJ19ILO7013.4	Understand the applications of integer programming and a queuing model and compute important performance measures.

D DJ19**ILO7014: Cyber Security and Laws**	
At the end of this course, students will be able to :	
DJ19ILO7014.1	.Understand the concept of cybercrime and its effect on outside world.
DJ19ILO7014.2	Interpret and apply IT law in various legal issues.
DJ19ILO7014.3	Distinguish different aspects of cyber law.
DJ19ILO7014.4	Apply Information Security Standards compliance during software design and development.

DJ19ILO7015: Personal Finance Management	
At the end of this course, students will be able to :	
DJ19ILO7015.1	Use a framework for financial planning to understand the overall role finances play in his/her personal life
DJ19ILO7015.2	Compute income from salaries, house property, business/profession, capital gains and income from other sources
DJ19ILO7015.3	Compute the amount of CGST, SGST and IGST payable after considering the eligible input tax credit.
DJ19ILO7015.4	Understand how Microfinance can help in financial inclusion.

DJ19ILO7019: Research Methodology	
At the end of this course, students will be able to :	
DJ19ILO7019.1	Prepare a preliminary research design for projects in their subject matter Areas.
DJ19ILO7019.2	Accurately collect, analyze and report data
DJ19ILO7019.3	Present complex data or situations clearly
DJ19ILO7019.4	Review and analyze research findings
DJ19ILO7019.5	Write report about findings of research carried out

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SEM VIII Course Outcomes

DJ19ECC801 & DJ19ECL801 Wireless Network Laboratory	
After completion of the course learner will be able to:	
DJ19ECC801.1	Understand wireless network standards and frequency bands used for various wireless technologies.
DJ19ECC801.2	Compare various personal area networks and understand their applications.
DJ19ECC801.3	Compare IEEE 802.11 standards and understand their features.
DJ19ECC801.4	Understand category 1 and category 2 applications of WSN and the required middleware

DJ19ECC802 & DJ19ECL802 Optical Communication – Laboratory	
At the end of this course, students will be able to :	
DJ19ECC802.1	Describe the propagation of light in optical fibers for the ray theory and electromagnetic mode theory.
DJ19ECC802.2	Analyze transmission characteristics (attenuation /dispersion/Nonlinearity) of anoptical fiber using differenttechniques.
DJ19ECC802.3	Compare and contrast working principle of optical sources, detectors and components
DJ19ECC802.4	Design optimal optical links by using Link budget and rise time budget and understand basic concepts ofoptical networks.

DJ19ECEC8015 & DJ19ECEL8015 Satellite Communication and Laboratory	
At the end of this course, students will be able to:	
DJ19ECEL8015.1	Explain basics of satellite communication, space segment and earth segment.
DJ19ECEL8015.2	Design(change verb or reframe) consideration for different satellite orbits andorbital parameters
DJ19ECEL8015.3	Identify space segment, types of earth station & their explanations.(remove ifnot required and specify details of earth stations)
DJ19ECEL8015.4	Design and analyze link budget of satellite signal for proper communication.
DJ19ECEL8015.5	Identify various applications of satellite communications.

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DJ19ECEC8016 & DJ19ECEL8016 Machine Learning for Signal Processing Theory and Laboratory	
At the end of this course, students will be able to :	
DJ19ECEC8016.1	Apply fundamentals of machine learning (ML) techniques useful forvarious signal processing applications.
DJ19ECEC8016.2	Understand various mathematical methods involved in ML for SignalProcessing.
DJ19ECEC8016.3	Design models for Speech Recognition and Audio Classification.
DJ19ECEC8016.4	Design efficient models for Image Processing.

DJ19ECEC8012 & DJ19ECEL8012: Internet Engineering & Network Security Theory and Laboratory	
On completion of the course, learner will be able to:	
DJ19ECEC8012.1	Use various application layer protocols.
DJ19ECEC8012.2	Understand services of network layer provided by advanced protocols and design networks as per requirements.
DJ19ECEC8012.3	Summarise voice over IP in the context of real-time interactive audio/video service
DJ19ECEC8012.4	Summarise various techniques to implement security mechanisms for network security and security implications on organizations.

DJ19ECP801 Project Stage – II	
At the end of this course, students will be able to :	
DJ19ECP801.1	Apply the technical knowledge gained from previous courses, Identify problems and design solutions to solve real-life problems
DJ19ECP801.2	Demonstrate technical skills required in an electronics industry for designing, building, testing electronic circuitry using modern software and hardware tools.
DJ19ECP801.3	Apply project management skills (scheduling work, procuring parts, documenting technical and non-technical details and working within the confined deadline).
DJ19ECP801.4	Develop and demonstrate troubleshooting ability in electronic circuits and systems (including software and hardware part of the systems).
DJ19ECP801.5	Create technical reports, research paper and present the same to the evaluation authorities.

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DJ19ILO8021: Project Management	
At the end of this course, students will be able to :	
DJ19ILO8021.1	Apply selection criteria and select an appropriate project from different options.
DJ19ILO8021.2	Write work break down structure for a project and develop a schedule based on it.
DJ19ILO8021.3	Identify opportunities and threats to the project and decide an approach to deal with them strategically.
DJ19ILO8021.4	Use Earned value technique and determine & predict status of the project.
DJ19ILO8021.5	Capture lessons learned during project phases and document them for future reference

DJ19ILO8022: Entrepreneurship Development and Management	
At the end of this course, students will be able to :	
DJ19ILO8022.1	Understand the concept of business plan and ownerships
DJ19ILO8022.2	Interpret key regulations and legal aspects of entrepreneurship in India
DJ19ILO8022.3	Understand government policies for entrepreneurs

DJ19ILO8025 Corporate Finance Management (CSM)	
At the end of this course, students will be able to :	
DJ19ILO8025.1	Understand Indian finance system
DJ19ILO8025.2	Apply concepts of time value money and risk returns to product, services and business.
DJ19ILO8025.3	Understand corporate finance; evaluate and compare performance of multiple firms
DJ19ILO8025.4	Take Investment, finance as well as dividend decisions.

DJ19ILO8026 Logistics and Supply Chain Management (LSCM)	
At the end of this course, students will be able to :	
DJ19ILO8026.1	Demonstrate the functional strategy map of supply chain management.
DJ19ILO8026.2	Analyse the determinants of Supply Chain and Transportation networks design.
DJ19ILO8026.3	Demonstrate the need of coordination and sourcing decisions in supply chain.
DJ19ILO8026.4	Understand pricing, revenue management and role of IT in supply chain.
DJ19ILO8026.5	Understand various sustainability aspects of a supply chain.

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DJ19ILO8029: Environmental Management	
At the end of this course, students will be able to :	
DJ19ILO8029.1	Understand the concept of environmental management
DJ19ILO8029.2	Understand ecosystem and interdependence, food chain etc.
DJ19ILO8029.3	Understand and interpret environment related legislation

ME EXTC Sem-I

DJS22EPGC101 Statistical Signal Processing	
At the end of course, a student will be able to:	
DJS22EPGC101.1	Understand basics of linear algebra in communication engineering
DJS22EPGC101.2	Study and apply the concepts of random processes in telecommunication engineering
DJS22EPGC101.3	Develop and evaluate different signal detection and estimation techniques in diverse telecommunication systems.
DJS22EPGC101.4	Compare optimal filtering, linear estimation, and Wiener/Kalman filtering
DJS22EPGC101.5	Construct Wiener and Kalman filters (time discrete) and state space models

DJS22EPGC102 Microstrip Antenna Design	
At the end of course, a student will be able to:	
DJS22EPGC102.1	Design and investigate Microstrip Antennas
DJS22EPGC102.2	Associate the elementary design of Microstrip Antennas to advanced communication applications
DJS22EPGC102.3	To understand the concept of next generation antennas

DJS22EPGL103 Skill Based Laboratory - I	
At the end of course, a student will be able to:	
DJS22EPGL103.1	To provide an in-depth view of the Professional Elective Courses and provide a base for which they can select their Second Year Project

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DJS22EPGC111 Advanced VLSI Design	
At the end of course, a student will be able to:	
DJS22EPGC111.1	Design CMOS circuits using different logic styles.
DJS22EPGC111.2	Analyse and design Low power VLSI circuits
DJS22EPGC111.3	Design circuits using Hardware descriptive language.
DJS22EPGC111.4	Design logic circuits using programmable logic devices.

DJS22EPGC112 Error Correcting Codes	
At the end of course, a student will be able to:	
DJS22EPGC112.1	Design channel codes for the physical layer and storage applications.
DJS22EPGC112.2	Design and analyse channel codes for wired/wireless communication systems

DJS22EPGC113 Next Generation Networks	
At the end of course, a student will be able to:	
DJS22EPGC113.1	Describe technical features and design considerations of the next-generation networks.
DJS22EPGC113.2	Apply the concept of convergence of network services.
DJS22EPGC113.3	Understand the transition of IP networks to NGN.
DJS22EPGC113.4	Demonstrate technologies for next-generation network

DJS22EPGC121 Advanced Image & Video Processing	
At the end of course, a student will be able to:	
DJS22EPGC121.1	Illustrate fundamental concepts related to multidimensional signal processing, feature extraction, pattern analysis.
DJS22EPGC121.2	Recognize geometrical mapping between 2D and 3D world.

DJS22EPGC122 Embedded Systems for Robotics	
At the end of course, a student will be able to:	
DJS22EPGC122.1	Describe the design procedures involved in product development process
DJS22EPGC122.2	Design, implement and test RTOS based embedded system.
DJS22EPGC122.3	Recognize the application of robotic system for industrial automation
DJS22EPGC122.4	Develop programming principles and languages for a robot control system.

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DJS22EPGC123 Optical Networks	
At the end of course, a student will be able to:	
DJS22EPGC123.1	Interpret functions of various optical network components
DJS22EPGC123.2	Compare different multiplexing techniques and optical network architectures.
DJS22EPGC123.3	Understand components and designing aspects of WDM networks
DJS22EPGC123.4	Explain photonic packet switching concepts and access networks
DJS22EPGC123.5	Analyze different network management functions

DJS22EPGL101 Statistical Signal Processing Laboratory	
At the end of course, a student will be able to:	
DJS22EPGL101.1	To gain an in-depth knowledge in the estimation of random signals.
DJS22EPGL101.2	Extrapolate the importance of least squares techniques and decomposition methods in analyzing the signal estimations.

DJS22EPGL102 Microstrip Antenna Design Laboratory	
At the end of course, a student will be able to:	
DJS22EPGL102.1	To gain an in-depth knowledge in the design of Microstrip antennas
DJS22EPGL102.2	Apply various practises predominant for design of Microstrip antenna

DJS22OPGC131 Data Analytics	
At the end of course, a student will be able to:	
DJS22OPGC131.1	Interpret data using descriptive statistics
DJS22OPGC131.2	Demonstrate sampling distributions and estimate statistical parameters
DJS22OPGC131.3	Develop hypothesis based on data and perform testing using various statistical techniques
DJS22OPGC131.4	Perform analysis of variance on data.
DJS22OPGC131.5	Examine relations between data

DJS22OPGC132 Journey from Intellectual Property to Patenting	
At the end of course, a student will be able to:	
DJS22OPGC132.1	Recognize the crucial role of IP for the purposes of product and technology development
DJS22OPGC132.2	Understand how and when to file a patent
DJS22OPGC132.3	Apply the knowledge to understand the entire ecosystem
DJS22OPGC132.4	Derive value from IP and leverage its value in new product and service development

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DJS22OPGC133 Cyber Security and Laws	
At the end of course, a student will be able to:	
DJS22OPGC133.1	Understand the distinct types of cybercrime and security issues E Business.
DJS22OPGC133.2	Analyses distinct types of cyber threats and techniques for security management
DJS22OPGC133.3	Explore the legal requirements and standards for cyber security in various countries to regulate cyberspace.
DJS22OPGC133.4	Impart the knowledge of Information Technology Act and legal framework of right to privacy, data security and data protection

DJS22OPGC134 Agile Frameworks	
At the end of course, a student will be able to:	
DJS22OPGC134.1	Summarize the concepts of agile practices and business objectives
DJS22OPGC134.2	Gain knowledge on the phases of agile development framework.
DJS22OPGC134.3	Have an exposure on the scaling factors and models to be developed for agile projects.
DJS22OPGC134.4	Acquire knowledge on the agile performance measurement.
DJS22OPGC134.5	Develop the product based on agile factors with risk mitigation
DJS22OPGC134.6	Describe the role of agile in enterprise management and incremental delivery

DJS22OPGC135 Design of Experiments	
At the end of course, a student will be able to:	
DJS22OPGC135.1	Plan data collection, to turn data into information and to make decisions that lead to appropriate action
DJS22OPGC135.2	Apply the methods taught to real life situations
DJS22OPGC135.3	Plan, analyze, and interpret the results of experiments

DJS22OPGC136 Operations Research	
At the end of course, a student will be able to:	
DJS22OPGC136.1	Convert a real-world problem in to a Linear Programming Problem and Interpret the solution obtained using Simplex method or other algorithms.
DJS22OPGC136.2	Understand reasons of formation of queues, Classify various queuing systems and Apply performance parameters defined for various queuing systems for decision making in real life situations.
DJS22OPGC136.3	Describe concept of simulation and Apply Monte Carlo Simulation technique to systems such as inventory, queuing and Develop solutions for them.
DJS22OPGC136.4	Solve the Game and explore the optimal strategies.
DJS22OPGC136.5	Identify the decision situations which vary with time and Analyze them using principle of dynamic programming to real life situations.

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ME EXTC Sem-II

DJS22EPGC201 RF and Microwave Engineering	
At the end of course, a student will be able to:	
DJS22EPGC201.1	Characterize devices at higher frequencies.
DJS22EPGC201.2	Design and analyze RF circuits and components
DJS22EPGC201.3	Design and analyze amplifiers, oscillators and mixers at microwave frequencies
DJS22EPGC201.4	Design and analyze power dividers, couplers at microwave frequencies.
DJS22EPGC201.5	Analyze EMI and EMC in RF circuit.

DJS22EPGC202 Advanced Wireless Communication Networks	
At the end of course, a student will be able to:	
DJS22EPGC202.1	To evaluate multichannel characteristics.
DJS22EPGC202.2	To outline the emerging technologies for upcoming Wireless Communication.
DJS22EPGC202.3	To assess network architecture of 5G.
DJS22EPGC202.4	To identify the need for Software Defined Networks.

DJS22EPGL203 Skill Based Laboratory -II	
At the end of course, a student will be able to:	
DJS22EPGL203.1	To provide an in depth view of the Professional Elective Courses and provide a base for which they can select their Second Year Project

DJS22EPGC211 Wavelets	
At the end of course, a student will be able to:	
DJS22EPGC211.1	Implement adaptive filters for a given application; study and apply the techniques of power spectrum estimation and wavelet theory for various applications.
DJS22EPGC211.2	Apply Signal Processing tools to biomedical signal processing and musical sound processing

DJS22EPGC212 IoT & Sensor Networks	
At the end of course, a student will be able to:	
DJS22EPGC212.1	Identify the IoT networking components with respect to OSI layer.
DJS22EPGC212.2	Design and develop IoT based sensor systems.
DJS22EPGC212.3	Select IoT protocols and software
DJS22EPGC212.4	Evaluate the wireless technologies for IoT.
DJS22EPGC212.5	Design architecture of IoT for various applications.
DJS22EPGC212.6	Appreciate the need for IoT Trust and variants of IoT

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DJS22EPGC213 Network and Cyber Security	
At the end of course, a student will be able to:	
DJS22EPGC213.1	Describe security threats and apply security techniques using cryptosystems
DJS22EPGC213.2	Describe different network security mechanisms
DJS22EPGC213.3	Define cybercrime, cybercriminals, and Intellectual property and discuss security implications on organizations.
DJS22EPGC213.4	Incorporate approaches for incident analysis and response, for risk management and digital evidence collection and evidentiary reporting in forensic acquisition.

DJS22EPGC221 Advanced Signal Analysis and Processing	
At the end of course, a student will be able to:	
DJS22EPGC221.1	Implement adaptive filters for a given application; study and apply the techniques of power spectrum estimation and wavelet theory for various applications.
DJS22EPGC221.2	Apply Signal Processing tools to biomedical signal processing and musical sound processing

DJS22EPGC222 Millimeter Wave Communication	
At the end of course, a student will be able to:	
DJS22EPGC222.1	Explain design constraint in communication systems at microwave and millimeter wave frequencies
DJS22EPGC222.2	Explain design consideration in Millimeter wave communication components and antennas.
DJS22EPGC222.3	Understand diversity over MIMO channels

DJS22EPGC223 Remote Sensing Concepts	
At the end of course, a student will be able to:	
DJS22EPGC223.1	Explain physical principles and sensing process in remote sensing
DJS22EPGC223.2	Describe preprocessing requirements and discuss various Digital Image Processing techniques.
DJS22EPGC223.3	Identify the earth surface features from satellite images
DJS22EPGC223.4	Apply the concepts of remote sensing for ecological applications

DJS22EPGL201 RF and Microwave Engineering Laboratory	
At the end of course, a student will be able to:	
DJS22EPGL201.1	Characterize devices at higher frequencies.
DJS22EPGL201.2	Do parametric study of transmission line and apply it for the design of passive components
DJS22EPGL201.3	Design and analyse amplifiers, oscillators at microwave frequencies.
DJS22EPGL201.4	Design and analyse power dividers, couplers at microwave frequencies.

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DJS22EPGL202 Advanced Wireless Communication Networks Laboratory	
At the end of course, a student will be able to:	
DJS22EPGL202.1	To gain an in-depth knowledge of various Wireless Propagation Models
DJS22EPGL202.2	Extrapolate the importance compression, spread spectrum, filter design for Wireless Networks.

DJS22OPGC231 Machine Learning	
At the end of course, a student will be able to:	
DJS22OPGC231.1	Analyze the applications, which can use Machine Learning Techniques
DJS22OPGC231.2	Understand and Apply regression, classification and clustering methods to the database.
DJS22OPGC231.3	Interpret the difference between supervised and unsupervised learning methods.
DJS22OPGC231.4	Understand the working of Reinforcement learning.
DJS22OPGC231.5	Understand basic concepts of Genetic Algorithms.

DJ22OPGC232 Renewable Energy	
At the end of course, a student will be able to:	
DJ22OPGC232.1	Identify sustainable energy solutions for sustainable development
DJ22OPGC232.2	Analyze renewable energy resources availability and utilization
DJ22OPGC232.3	Demonstrate competency in renewable systems analysis independently

DJS22OPGC233 Digital Marketing	
At the end of course, a student will be able to:	
DJS22OPGC233.1	Apply B2B and B2C contexts to plan content marketing
DJS22OPGC233.2	Develop and measure impact of content that works well for your target audience
DJS22OPGC233.3	Manage social media presence, and create effective content for each platform.
DJS22OPGC233.4	Optimize search engine presence through on-site and off-site activities, develop target keyword list, optimize website UX and design, and execute a link building campaign.
DJS22OPGC233.5	Create, execute, and optimize an effective Ad campaign. Display and set up advertising works.
DJS22OPGC233.6	Create an email marketing strategy, create and execute email campaigns, and measure the results.

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DJS22OPGC234 Project Management	
At the end of course, a student will be able to:	
DJS22OPGC234.1	Assess a project by establishing a business case and accordingly prepare a project proposal.
DJS22OPGC234.2	Develop a project plan
DJS22OPGC234.3	Identify task inter-dependencies, construct and analyze a network diagram
DJS22OPGC234.4	Monitor and control the performance of the project
DJS22OPGC234.5	Demonstrate Team work and team spirit and resolve conflicts

DJS22OPGC235 Research Methodology	
At the end of course, a student will be able to:	
DJS22OPGC235.1	Understand research concepts, types, significance and importance of research profile.
DJS22OPGC235.2	Prepare a preliminary research design for projects in their subject matter areas.
DJS22OPGC235.3	Accurately collect, analyze and report data
DJS22OPGC235.4	Review and analyze research findings.
DJS22OPGC235.5	Prepare the research report.

DJS22OPGC236 Product Life Cycle Management	
At the end of course, a student will be able to:	
DJS22OPGC236.1	Gain knowledge about phases of PLM, PLM strategies and methodology for PLM feasibility study and PDM implementation
DJS22OPGC236.2	Illustrate various approaches and techniques for designing and developing products
DJS22OPGC236.3	Understand the need for Product Life Cycle Assessment (LCA) and Life Cycle Cost Analysis.
DJS22OPGC236.4	Demonstrate the various PLM Applications, Modules, and virtual product development tools for components, machining and manufacturing plant.
DJS22OPGC236.5	Appreciate the significant effect of effective marketing strategies and integration of PLM with other business modules.

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S.Y. B.Tech(Semester III) Course Outcome

Course : Discrete Structures(DJ19ITC301)

Outcomes: On completion of the course, learner will be able to:

DJ19ITC301.1	Comprehend discrete mathematical preliminaries.
DJ19ITC301.2	Apply Relations and Functions to solve Engineering problems.
DJ19ITC301.3	Apply various concepts of Group and Ring Theory to solve Engineering problems.
DJ19ITC301.4	Apply concept of Graphs, Trees and Lattice Theory in formal representation of various

Course : Data Structures and Algorithms(DJ19ITC302)

Outcomes: On completion of the course, learner will be able to:

DJ19ITC302.1	Analyze the algorithms based on time and space complexity.
DJ19ITC302.2	Solve the problem using appropriate data structure.
DJ19ITC302.3	Implement appropriate searching algorithm for a given problem.
DJ19ITC302.4	Implement appropriate sorting algorithm for a given problem

Course : Database Management System(DJ19ITC303)

Outcomes: On completion of the course, learner will be able **to:**

DJ19ITC303.1	Design an optimized database.
DJ19ITC303.2	Construct SQL queries to perform operations on database.
DJ19ITC303.3	Explain the concepts of transaction management.
DJ19ITC303.4	Demonstrate appropriate transaction recovery techniques for a given problem.
DJ19ITC303.5	Apply indexing mechanisms for efficient retrieval of information from database.
DJ19ITC303.6	Work effectively as a member of a team

Course: Digital Logic Design (DJ19ITC304)

Outcomes: On completion of the course, learner will be able to:

DJ19ITC304.1	Perform inter-conversion between various types of codes and number systems useful indigital communication and computer systems.
DJ19ITC304.2	Implement combinational circuits by using the appropriate techniques.

DJ19ITC304.3	Implement sequential circuits by using the appropriate techniques.
DJ19ITC304.4	Develop assembly language programs for 8086 microprocessor.

Course: Operating System (DJ19ITC305)

Outcomes: On completion of the course, learner will be able to:

DJ19ITC305.1	Analyze and evaluate the performance of different process and disk scheduling algorithms.
DJ19ITC305.2	Demonstrate inter-process communication and process synchronization.
DJ19ITC305.3	Analyze and evaluate various deadlock detection, avoidance and removal techniques.
DJ19ITC305.4	Analyze and evaluate memory management policies in different scenarios.
DJ19ITC305.5	Evaluate different file organization and access technique

Programming Laboratory 1 (Java and Advanced Java) (DJ19ITL306)

Outcomes: On completion of the course, learner will be able to:

DJ19ITL306.1	Develop applications by applying SOLID principles as well as appropriate Object Oriented
DJ19ITL306.2	Debug a given code, rectify the errors to get the desired output.
DJ19ITL306.3	Make suitable modifications to programs as per user requirements for solving real world
DJ19ITL306.4	Develop GUI applications using modern APIs (JAVAFX, swings, etc.)
DJ19ITL306.5	Work effectively as a member of a team.

Innovative Product Development I(DJ19A2)

Outcomes: On completion of the course, learner will be able to:

DJ19A2.1	Identify the requirement for a product based on societal/research needs.
DJ19A2.2	Apply knowledge and skills required to solve a societal need by conceptualizing aproduct, especially while working in a team.
DJ19A2.3	Use standard norms of engineering concepts/practices in the design and development ofan innovative product.
DJ19A2.4	Draw proper inferences through theoretical/ experimental/simulations and analyze theimpact of the proposed method of design and development of the product.
DJ19A2.5	Develop interpersonal skills, while working as a member of the team or as the leader.
DJ19A2.6	Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, which could eventually prepare them to be successful entrepreneurs.

DJ19A2.7	Demonstrate product/project management principles during the design and development work and also excel in written (Technical paper preparation) as well asoral communication

Course : Constitution of India(DJ19A3)

Outcomes: On completion of the course, learner will be able to:

DJ19A3.1	Have general knowledge and legal literacy and thereby to take up competitive examinations.
DJ19A3.2	Understand state and central policies, fundamental duties.
DJ19A3.3	Understand Electoral Process, special provisions.
DJ19A3.4	Understand powers and functions of Municipalities, Panchayats and Co-OperativeSocieties.
DJ19A3.5	Understand Engineering ethics and responsibilities of Engineers.
DJ19A3.6	Understand Engineering Integrity & Reliability.

S.Y. B. Tech(Semester IV)
Course Outcome

Course : Probability & Statistics(DJ19ITC401)

Outcomes: On completion of the course, learner will be able to:

DJ19ITC401.1	Apply the Number Theory in IT domain.
DJ19ITC401.2	Apply Linear Programming methods to solve engineering problems.
DJ19ITC401.3	Probability Distribution?
DJ19ITC401.4	Perform Data Analysis using Sampling theory.
DJ19ITC401.5	Identify the relationship amongst various attributes of sample data sets using suitable

Course : Formal Languages and Automata Theory(DJ19ITC402)

Outcomes: On completion of the course, learner will be able to:

DJ19ITC402.1	Design formal grammar.
DJ19ITC402.2	Design computational model.
DJ19ITC402.3	Apply rigorously formal mathematical methods to prove properties of formal languages.
DJ19ITC402.4	Prove that the certain languages are undecidable.

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Course : Design and Analysis of Algorithms(DJ19ITC403)

Outcomes: On completion of **the course, learner will be able to:**

DJ19ITC403.1	Analyze the performance of algorithms using asymptotic analysis.
DJ19ITC403.2	Solve the problem using appropriate algorithmic design techniques.
DJ19ITC403.3	Able to prove that certain problems are NP-Complete.

Course : Computer Networks(DJ19ITC404)

Outcomes: On completion of the course, learner will be able to:

DJ19ITC404.1	Explain the role of each layer of the OSI and TCP/IP models. 2. 3. 4. 5. 6.
DJ19ITC404.2	Explore the standard client server applications of the application layer.
DJ19ITC404.3	Implement Transport Layer protocols.
DJ19ITC404.4	Implement appropriate routing algorithms for network-layer packet delivery.
DJ19ITC404.5	Explore the data link layer services & multiple access techniques
DJ19ITC404.6	Classify various transmission media.

Course: Web Programming(DJ19ITC405)

Outcomes: On completion of the course, learner will be able to:

DJ19ITC405.1	Develop web applications.
DJ19ITC405.2	Test the web applications.
DJ19ITC405.3	Validate web applications for conformance to latest W3C markup and accessibilitystandards.
DJ19ITC405.4	Work effectively as a member of a team.

Course: Programing Laboratory 2 (Python)(DJ19ITL406) Outcomes:

On completion of the course, learner will be able to:

DJ19ITL406.1	Write clean python code/Code correctly in Python with a clean coding standards.
DJ19ITL406.2	Debug the programs.
DJ19ITL406.3	Develop user friendly applications.
DJ19ITL406.4	Implement basic Machine Learning and Data Science Techniques with visualizations.
DJ19ITL406.5	Work effectively as a member of a team.

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Course: Universal Human Values(DJ19IHC1)

Outcomes: On completion of the course, learner will be able to:

DJ19IHC1.1	Become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainablesolutions, while keeping human relationships and human nature in mind. They would have better critical ability.
DJ19IHC1.2	Become sensitive to their commitment towards what they have understood (human values, human relationship, and human society).
DJ19IHC1.3	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.

Course: Innovative Product Development II(DJ19A4)

Outcomes: On completion of the course, learner will be able to

DJ19A4.1	Identify the requirement for a product based on societal/research needs.
DJ19A4.2	Apply knowledge and skills required to solve a societal need by conceptualizing a product,especially while working in a team.
DJ19A4.3	Use standard norms of engineering concepts/practices in the design and development of aninnovative product.
DJ19A4.4	Draw proper inferences through theoretical/ experimental/simulations and analyze theimpact of the proposed method of design and development of the product.
DJ19A4.5	Develop interpersonal skills, while working as a member of the team or as the leader.
DJ19A4.6	Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, which could eventually prepare them to be successful entrepreneurs.
DJ19A4.7	Demonstrate product/project management principles during the design and developmentwork and also excel in written (Technical paper preparation) as well as oral communication

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T.Y. B.Tech (Semester-V)

Course: Cryptography and Network Security(DJ19ITC501)

Outcomes: On completion of the course, learner will be able to:

DJ19ITC501.1	Design secure system using appropriate mechanism

Course : Advanced Data Structures(DJ19ITC502)

Outcomes: On completion of the course, learner will be able to:

DJ19ITC502.1	Carry out amortized Analysis of algorithms.
DJ19ITC502.2	Solve a problem using appropriate data structure.

Course : Data Warehousing and Mining(DJ19ITC503) Outcomes:

On completion of the course, learner will be able to:

DJ19ITC503.1	Design a data warehouse models using dimension-modeling techniques.
DJ19ITC503.2	Analyze the data by applying Online Analytical Processing (OLAP) operations forstrategic decisions.
DJ19ITC503.3	Apply preprocessing techniques for a given raw data.
DJ19ITC503.4	Apply appropriate data mining techniques on data sets to retrieve relevant information.
DJ19ITC503.5	Work effectively as a member of the team.

Course : Artificial Intelligence(DJ19ITC504)

Outcomes: On completion of the course, learner will be able to:

DJ19ITC504.1	Solve the problem using appropriate AI techniques.
DJ19ITC504.2	Apply NLP techniques on domain specific problems.
DJ19ITC504.3	Work effectively as a member of the team.

Course : Professional and Business Communication Laboratory(DJ19ITC505)

Outcomes: On completion of the course, learner will be able to:

DJ19ITC505.1	Plan, organize and write technical documents like reports, proposals and research papers in the prescribed format using appropriate language and style with an understanding of ethics in written communication.
DJ19ITC505.2	Apply techniques of writing resume, participating in a group discussion and facinginterviews.
DJ19ITC505.3	Develop interpersonal skills in professional and personal situations.
DJ19ITC505.4	Understand the documentation process of meetings and conduct meetings in a professional manner.
DJ19ITC505.5	Understand communication across cultures and work ethics.
DJ19ITC505.6	Design and deliver effective presentations using Power Point

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Course : Microcontrollers and Embedded Systems(DJ19ITEC5011)

Outcomes: On completion of the course, learner will be able to:

DJ19ITEC5011.1	Write assembly program for 8051
DJ19ITEC5011.2	Write assembly program for ARM 7.
DJ19ITEC5011.3	Design interfacing for 8051 microcontrollers.
DJ19ITEC5011.4	Prioritize tasks in a real-time system using appropriate scheduling algorithms.
DJ19ITEC5011.5	Develop solutions for real world problems using appropriate embedded boards.

Course : Human Computer Interaction(DJ19ITEC5012)
Outcomes: On completion of the course, learner will be able to:

DJ19ITEC5012.1	Develop user interface using appropriate HCI design principles.
DJ19ITEC5012.2	Evaluate user interface design.
DJ19ITEC5012.3	Perform empirical research.
DJ19ITEC5012.4	Work effectively as a member of the team.

Course : Statistical Analysis(DJ19ITEC5013)
Outcomes: On completion of the course, learner will be able to:

DJ19ITEC5013.1	Summarize data using suitable diagrams.
DJ19ITEC5013.2	Perform Test of Hypothesis based on independence.
DJ19ITEC5013.3	Perform test of hypothesis for goodness of fit.
DJ19ITEC5013.4	Estimate confidence interval for a population parameter.
DJ19ITEC5013.5	Estimate relationship between two or more variables using appropriate model.

Course : Innovative Product Development-III(DJ19ILL1)

Outcomes: On completion of the course, learner will be able to:

DJ19ILL1.1	Identify the requirement for a product based on societal/research needs.
DJ19ILL1.2	Apply knowledge and skills required to solve a societal need by conceptualizing a product,especially while working in a team.
DJ19ILL1.3	Use standard norms of engineering concepts/practices in the design and development of aninnovative product.
DJ19ILL1.4	Draw proper inferences through theoretical/ experimental/simulations and analyze the impact of the proposed method of design and development of the product.
DJ19ILL1.5	Develop interpersonal skills, while working as a member of the team or as the leader.
DJ19ILL1.6	Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, while analyzing the ethical and social issues of entrepreneurs.
DJ19ILL1.7	Demonstrate product/project management principles during the design and developmentwork and also excel in written (Technical paper preparation) as well as oral communication

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Parallel and Distributed Computing(DJ19ITC601)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITC601.1	Develop parallel computing solutions to a given problem.
DJ19ITC601.2	Develop distributed applications.
DJ19ITC601.3	Suggest appropriate cloud computing solutions.

Course : Software Engineering(DJ19ITC602)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITC602.1	Select suitable software development lifecycle model(s) for software development.
DJ19ITC602.2	Analyze real world problem using software engineering principles.
DJ19ITC602.3	Work effectively as a member of the team

Course: Image Analysis And Computer Vision (DJ19ITC603)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITC603.1	Describe fundamentals of computing on images.
DJ19ITC603.2	Apply suitable processing techniques on image.
DJ19ITC603.3	Apply motion analysis on real time problem
DJ19ITC603.4	Build a computer vision application with team members to solve real-time problems.
DJ19ITC603.5	Work effectively as a member of the team.

Course: Internet of Things(DJ19ITEC6011)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITEC6011.1	Develop IoT applications using suitable enabler technologies.
DJ19ITEC6011.2	Analyze IoT application data stored on cloud.
DJ19ITEC6011.3	Work effectively as a member of the team.

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Course : UI/UX(DJ19ITEC6012)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITEC6012.1	Identify user requirements.
DJ19ITEC6012.2	Design UI/UX using appropriate methods.
DJ19ITEC6012.3	Generate test report using usability testing.
DJ19ITEC6012.4	Work effectively as a member of the team.

Course : Big Data Analytics(DJ19ITEC6013)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITEC6013.1	Identify big data applications using its characteristics.
DJ19ITEC6013.2	Explore Hadoop Ecosystem with their roles to solve Big Data problems.
DJ19ITEC6013.3	Apply advanced data mining algorithm for big data analytics

Course : Soft Computing(DJ19ITEC6014)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITEC6014.1	Analyse a real-life problem.
DJ19ITEC6014.2	Solve real-life problem using appropriate soft computing technique(s)

Course : Infrastructure Security(DJ19ITEC6015)
Course Outcomes: On completion of the course, student should be able to:

DJ19ITEC6015.1	Evaluate the impact of cybersecurity threats for critical infrastructure protection.
DJ19ITEC6015.2	Apply appropriate security policies and mitigation techniques for protecting theinfrastructure components.

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Course : Information Systems & IT Governance(DJ19ITEC6016)
Course Outcomes: On completion of the course, student should be able to:

DJ19ITEC6016.1	Identify the necessary support an information system can provide to each functional areaof the organization.
DJ19ITEC6016.2	Evaluate the IT investment process.
DJ19ITEC6016.3	Assess IT investment decisions as per the goals and strategies of the organization.

Course : Innovative Product Development-IV(DJ19ILL2)
Course Outcomes: On completion of the course, student should be able to:

DJ19ILL2.1	Identify the requirement for a product based on societal/research needs.
DJ19ILL2.2	Apply knowledge and skills required to solve a societal need by conceptualizing a product,especially while working in a team.
DJ19ILL2.3	Use standard norms of engineering concepts/practices in the design and development of aninnovative product.
DJ19ILL2.4	Draw proper inferences through theoretical/ experimental/simulations and analyze theimpact of the proposed method of design and development of the product.
DJ19ILL2.5	Develop interpersonal skills, while working as a member of the team or as the leader.
DJ19ILL2.6	Demonstrate capabilities of self-learning as part of the team, leading to life-longlearning, which could eventually prepare them to be successful entrepreneurs.
DJ19ILL2.7	Demonstrate product/project management principles during the design and development work and also excel in written (Technical paper preparation) as well asoral communication

Course : Environmental Studies(DJ19A5)

Course Outcomes: On completion of the course, student should be able to:

DJ19A5.1	Understand how human activities affect environment
DJ19A5.2	Understand the various technology options that can make a difference

Department of Information Technology

B. E. Information Technology (Semester-VII)

Course: Service Oriented Architecture(DJ19ITC701)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITC701.1	Create web services using development tools.
DJ19ITC701.2	Build SOA-based solutions for intra-enterprise and inter-enterprise applications.

Course: Design Thinking(DJ19ITC702)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITC702.1	Develop a holistic application using Design Thinking Principles.
DJ19ITC702.2	Work efficiently as a team member.

Course: Wireless Sensor Network(DJ19ITEC7011)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITEC7011.1	Specify the requirements for the hardware and software solutions for energy-efficientsensor network,
DJ19ITEC7011.2	Analyze various critical parameters in deploying a WSN.
DJ19ITEC7011.3	Apply appropriate algorithms to improve existing or to develop new WSN applications
DJ19ITEC7011.4	Design a WSN for given sensor data using microcontroller, transceiver, middleware andoperating system.
DJ19ITEC7011.5	Work effectively as a member of a team.

Course: Augmented and Virtual Reality(DJ19ITEC7012)
Course Outcomes: On completion of the course, student should be able to:

DJ19ITEC7012.1	Develop Virtual Reality applications.
DJ19ITEC7012.2	Develop Augmented Reality applications
DJ19ITEC7012.3	Work effectively as a member of a team.

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Course: Business Analytics(DJ19ITEC7013)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITEC7013.1	Apply business intelligence methods to various situations.
DJ19ITEC7013.2	Interpret the results
DJ19ITEC7013.3	Identify a problem or an opportunity by taking appropriate courses of action for a givenmanagerial situation.

Course: Machine Learning(DJ19ITEC7014)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITEC7014.1	Solve real-world problems using suitable machine learning techniques

Course: Blockchain Technology(DJ19ITEC7015)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITEC7015.1	Survey different blockchain platforms, their architectures and applications.
DJ19ITEC7015.2	Develop smart contracts on Ethereum framework using solidity language
DJ19ITEC7015.3	Analyze the real-world problems that can be solved using blockchain technology.

Course: Project-I(DJ19ITP704)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITP704.1	Discover potential research areas in the field of IT.
DJ19ITP704.2	Survey several available literatures in the related field of study.
DJ19ITP704.3	Compare the several existing solutions for research challenges.
DJ19ITP704.4	Design the solution for the research plan.
DJ19ITP704.5	Summarize the findings of the study conducted.
DJ19ITP704.6	Work effectively as a member of the team.

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B. Y. B. Tech. (Semester-VIII) Course Outcomes

Course:Semantic Web Technology(DJ19ITC801)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITC801.1	Model ontologies using Resource Description Framework (RDF) and Web OntologyLanguage (OWL).
DJ19ITC801.2	Query ontologies using SPARQL.
DJ19ITC801.3	Apply Semantic web technologies to real world applications

Course:Design Patterns (DJ19ITC802)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITC801.2	Identify and apply the most suitable design pattern to address a given application designproblem

Course: Industrial Internet of Things(DJ19ITEC8011)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITEC8011.1	Explore Industry 4.0 and IIoT technologies, architectures, standards, and protocols
DJ19ITEC8011.2	Examine the technological developments that will shape the industrial landscape in thefuture.
DJ19ITEC8011.3	Work effectively as a member of team.

Course: Game Design & Gamification(DJ19ITEC8012)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITEC8012.1	Design games using gamification principles.
DJ19ITEC8012.2	Work effectively as a member of a team.

Course: Predictive Analytics(DJ19ITEC8013)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITEC8013.1	Apply prediction modeling techniques to turn data into actionable insights.
DJ19ITEC8013.2	Select a suitable model to carry out the prediction.

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Course: Advanced Machine Learning(DJ19ITEC8014)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITEC8014.1	Develop an appropriate machine learning model.
DJ19ITEC8014.2	Apply optimization techniques to real world problems.
DJ19ITEC8014.3	Work efficiently as a part of a team.

Course: Advanced Security(DJ19ITEC8015)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITEC8015.1	Perform appropriate surveillance of IT infrastructure for vulnerabilities.
DJ19ITEC8015.2	Describe how Security Operations Centers (SOC) work as a valuable resource forsecurity incident detection.
DJ19ITEC8015.3	Analyze cybersecurity incidents.
DJ19ITEC8015.4	Reconstruct the series of events using suitable Incident Response (IR) process.

Course: Quantum Computing(DJ19ITEC8016)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITEC8016.1	Design quantum circuits.
DJ19ITEC8016.2	Implement quantum algorithms.

Course: Project-II(DJ19ITP803)

Course Outcomes: On completion of the course, student should be able to:

DJ19ITP803.1	Develop the proposed solution using appropriate techniques.
DJ19ITP803.2	Test the developed system for its correctness using appropriate techniques.
DJ19ITP803.3	Work effectively as a member of the team
DJ19ITP803.4	Students will evaluate text processing techniques and operations in information retrievalsystem.
DJ19ITP803.5	Students will demonstrate and evaluate various indexing and searching techniques.
DJ19ITP803.6	Student will design the user interface for an information retrieval system.

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S.Y. B. TECH

Semester III Course Outcomes

DJ19MEC301 & DJ19MET301- Engineering Mathematics III

Learners will be able to:	
DJ19MEC301.1	Use Laplace and inverse Laplace Transform to the Ordinary Differential Equations
DJ19MEC301.2	Identify analytic and harmonic functions and solve real integrals using complex integration
DJ19MEC301.3	Find Fourier Series of periodic functions and simplify infinite series
DJ19MEC301.4	Solve certain partial differential equations analytically and numerically
DJ19MEC301.5	Correlate different variables of data

DJ19MEC302-Engineering Thermodynamics

Learners will be able to:	
DJ19MEC302.1	Demonstrate application of the first law of thermodynamics to wide range of systems.
DJ19MEC302.2	Write steady flow energy equation for various flow and non-flow thermodynamic systems
DJ19MEC302.3	Compute heat and work interactions in thermodynamics systems
DJ19MEC302.4	Demonstrate the interrelations between thermodynamic functions to solve practical problems
DJ19MEC302.5	Use steam table and mollier chart to compute thermodynamics interactions
DJ19MEC302.6	Compute efficiencies of heat engines, power cycles etc.

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DJ19MEC303 & DJ19MEL303 - Strength of Materials

Learners will be able to:	
DJ19MEC303 .1	Evaluate stresses, strains, deformation and properties of materials in mechanical components/ structures.
DJ19MEC303 .2	Draw SFD and BMD for different types of loads and support conditions for a beam
DJ19MEC303 .3	Compute and plot direct, bending and shear stresses across sections of given beam.
DJ19MEC303 .4	Compute torsional shear stresses and strain energy in mechanical components.
DJ19MEC303 .5	Compute deflections and slopes in beams.
DJ19MEC303 .6	Analyze buckling phenomenon in columns and struts.

DJ19MEC304 : **Manufacturing Processes**

Learners will be able to:	
DJ19MEC304.1	Demonstrate understanding of various machine tool operations for machining.
DJ19MEC304.2	Understand applications of casting process to produce metal/polymer components.
DJ19MEC304.3	Demonstrate understanding of joining of metals through fastening, soldering, brazing and welding.
DJ19MEC304.4	Illustrate the concept of producing semi-finished rolled products, forged components, extrusions, wires and sheet metal components.
DJ19MEC304.5	Illustrate the concept of producing powder metallurgical components.

DJ19MEC305 & DJ19MEL305- Materials Technology

Learners will be able to:	
DJ19MEC305.1	Demonstrate fundamental knowledge about various types of materials, crystal structure, crystal imperfection, material property, deformation in materials.
DJ19MEC305.2	Understand different types of failure mechanism in materials and its significance.
DJ19MEC305.3	Interpret Iron-Iron carbide diagram, TTT diagram & their significance.
DJ19MEC305.4	Select appropriate heat treatment process for specific applications.
DJ19MEC305.5	Understand advance engineering materials, their properties, applications & selection.

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DJ19MEL306 -Computer Aided Machine Drawing Laboratory

Learners will be able to:	
DJ19MEL306.1	Visualize and prepare detail drawing of a given object.
DJ19MEL306 .2	Read and interpret the drawing
DJ19MEL306.3	Draw details and assembly of different mechanical systems.
DJ19MEL306 .4	Convert detailed drawing into assembly drawing using modelling software
DJ19MEL306 .5	Convert assembly drawing into detailed drawing using modelling software
DJ19MEL306 .6	Prepare detailed drawing of any given physical object/machine element with actual measurements.

DJ19MEL307- Machine Shop Practice I:

Learners will be able to:	
DJ19MEL307.1	Perform plain turning, taper turning, and thread cutting etc. on lathe machine.
DJ19MEL307.2	Perform machining operations on shaper.
DJ19MEL307.3	Perform Drilling-Boring operations on drilling machine and milling operations.
DJ19MEL307.4	Perform grinding operations to obtain a finished assembly
DJ19MEL307.5	Visualize and prepare detail drawing of a given object.

DJ19MEL306 - Constitution of India,

Learners will be able to:	
DJ19A3.1	Have general knowledge and legal literacy and thereby to take up competitive examinations.
DJ19A3.2	Understand state and central policies, fundamental duties.
DJ19A3.3	Understand Electoral Process, special provisions.
DJ19A3.4	Understand powers and functions of Municipalities, Panchayats and Co- operative Societies,
DJ19A3.5	Understand Engineering ethics and responsibilities of Engineers
DJ19A3.6	Understand Engineering Integrity & Reliability.

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Sem IV: Course Outcomes

DJ19MEC401 & DJ19MET401- Engineering Mathematics IV

Learners will be able to:	
DJ19MEC401.1	1. Identify diagonalizable and derogatory matrices and find functions as a square matrix using eigenvalues and eigenvectors.
DJ19MEC401.2	2. Evaluate vector integrals
DJ19MEC401.3	3. Use probability to solve real-life engineering problems
DJ19MEC401.4	4. Draw conclusions on population based on large and small samples taken.
DJ19MEC401.5	5. Analyze the variances of multiple variables simultaneously

DJ19MEC402 & DJ19MEC402- Fluid Mechanics

Learners will be able to:	
DJ19MEC402.1	1. Explain the key fluid properties, calculate the pressure, hydrostatic pressure force, buoyant force and discuss the stability of floating or submerged bodies.
DJ19MEC402.2	2. Identify various flow characteristics based on the velocity field and determine the streamline pattern and acceleration field given a velocity field.
DJ19MEC402.3	3. Explain the development, uses, and limitations of the Bernoulli equation and apply the Reynolds transport theorem and the material derivative, analyze certain types of flows using the Navier–Stokes equations.
DJ19MEC402.4	4. Identify and understand various characteristics of the flow in pipes, calculate losses in straight portions of pipes as well as those in various pipe system components, apply appropriate equations and principles to analyze a variety of
DJ19MEC402.5	5. Explain the fundamental characteristics of a boundary layer, including laminar, transitional, and turbulent regimes, calculate boundary layer parameters for flow past a flat plate, provide a description of boundary layer separation.
DJ19MEC402.6	6. Understand some important features of different categories of compressible flows of ideal gases, solve useful problems involving isentropic and non-isentropic flows including flows across normal shock waves

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DJ19MEC403 & DJ19MEL403 - Mechanical Measurements and Metrology :

Learners will be able to:	
DJ19MEC403.1	1. Classify various types of static characteristics and types of errors occurring in the system.
DJ19MEC403.2	2. Classify and select proper measuring instrument for displacement, strain, pressure and temperature measurement.
DJ19MEC403.3	3. Classify and select proper measuring instrument for linear and angular measurement.
DJ19MEC403.4	4. Demonstrate inspection methods and design of different limit gauges.
DJ19MEC403.5.	5. Demonstrate characteristics of surface texture, screw threads, and gear measurements.

DJ19MEC404 - Advanced Manufacturing Processes

Learners will be able to:	
DJ19MEC404.1	Demonstrate understanding of machining operations through CNC machine.
DJ19MEC404.2	Understand concepts of Additive Manufacturing Technology.
DJ19MEC404.3	Demonstrate understanding of production of metal components through Non-Traditional Machining.
DJ19MEC404.4	Understand techniques of and Destructive testing of components & machines through Non- destructive Testing techniques.
DJ19MEC404.5	Understand basics of some futuristic manufacturing concepts.

DJ19MEC405 & DJ19MEL405 : **Kinematics of Machinery**

Learners will be able to:	
DJ19MEC405.1	Analyse kinetics of rigid bodies
DJ19MEC405.2	Define various components of mechanisms
DJ19MEC405.3	Draw velocity and acceleration diagrams of various mechanisms
DJ19MEC405.4	Draw Cam profile for the specific follower motion
DJ19MEC405.5	Select appropriate power transmission system for specific application

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DJ19MEL406 : Machine Shop Practice II

Learners will be able to:	
DJ19MEC406.1	Understand turning operations done on Turning Centre.
DJ19MEC406.2	Understand machining operations done on Vertical Machining Centre.
DJ19MEC406.3	Perform 3 D Printing techniques to manufacture a simple component

DJS22IHC1: Universal Human Values

Learners will be able to:	
DJS22IHC1.1	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
DJS22IHC1.2	Become sensitive to their commitment towards what they have understood (human values, human relationships, and human society).
DJS22IHC1.3	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.

DJS22ILLA2: Innovative Product Development-II

Learners will be able to:	
DJS22ILLA2.1	Identify the requirement for a product based on societal/research needs.
DJS22ILLA2.2	Apply knowledge and skills required to solve a societal need by conceptualizing a product, especially while working in a team
DJS22ILLA2.3	Use standard norms of engineering concepts/practices in the design and development of an innovative product.
DJS22ILLA2.4	Draw proper inferences through theoretical/ experimental/simulations and analyze the impact of the proposed method of design and development of the product.
DJS22ILLA2.5	Develop interpersonal skills, while working as a member of the team or as the leader..
DJS22ILLA2.6	Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, which could eventually prepare themselves to be successful entrepreneurs.

DJS22A3 : Environmental Studies

Learners will be able to:	
DJS22A3:.1	Understand how human activities affect environment
DJS22A3.2	Understand the various technology options that can make aa difference

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T.Y. B. TECH Semester V Course Outcomes

DJ19MEC501 & DJ19MEL501- Automobile Prime Mover:

Learners will be able to:	
DJ19MEC501.1	Explain the construction and working of internal combustion engines.
DJ19MEC501.2	Demonstrate the working systems of spark ignition & compression ignition engines.
DJ19MEC501.3	Demonstrate the engine cooling, lubrication and super-charging systems.
DJ19MEC501.4	Analyse various engine performance parameters.
DJ19MEC501.5.	Describe the different hybrid and electric powertrain systems.

DJ19MEC502 & DJ19MEL502-Heat Transfer

Learners will be able to:	
DJ19MEC502.1	1. Explain the mechanism of heat transfer by conduction and analyse various types of one dimensional heat conduction problems.
DJ19MEC502.2	2. Explain the mechanism of heat transfer by convection and analyse free and forced convection problems.
DJ19MEC502.3	3. Find the rate of heat transfer by radiation and analyse the effect of radiation shield in radiation exchange between two surfaces.
DJ19MEC502 .4	4. Explain different types of heat exchangers and analyse heat exchanger using LMTD & NTU method.

DJ19MEC503 & DJ19MEL503- Mechanical Vibrations

Learners will be able to:	
DJ19MEC503.1	Develop mathematical model to represent dynamic system 2
DJ19MEC503 .2	Evaluate natural frequency of mechanical element / system
DJ19MEC503 .3	Analyze response of mechanical element / system, executing free and forced vibration
DJ19MEC503.4	Estimate the values of various elements of vibrating systems, required to achieve vibration isolation and control
DJ19MEC503 .5.	Analyze working of vibration measuring instruments

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DJ19MEC504 & DJ19MEL504 - Industrial Electronics and Control:

Learners will be able to:	
DJ19MEC504.1	Illustrate construction, working principles and applications of power electronic switches
DJ19MEC504.2	Identify rectifiers and inverters for dc and ac motor speed control
DJ19MEC504.3	Develop circuits using OPAMP and timer IC555
DJ19MEC504.4	Identify digital circuits for industrial applications
DJ19MEC504.5	Design mathematical model of system/process for standard input responses
DJ19MEC504.6	Analyze error and differentiate various types of control systems and time domain

DJ19MEC5011- Machine Tool Engineering

Learners will be able to:	
DJ19MEC5011.1	Analyse various single and multipoint cutting tools with tool nomenclature as per standards and their design principles.
DJ19MEC5011.2	Analyse tool life and economics of machining.
DJ19MEC5011.3	Understand design principles of press tool components for piercing and blanking operation.
DJ19MEC5011.4	Illustrate design principles of press tool components in bending and drawing operation.
DJ19MEC5011.5	Understand appropriate combination of tools, jigs and fixture, suitable for a particular machining operation.

DJ19MEC5012- Renewable Energy Systems:

Learners will be able to:	
DJ19MEC5012.1	Explain the need of different renewable energy sources.
DJ19MEC5012.2	Discuss importance of renewable energy sources.
DJ19MEC5012.3	Discuss various renewable energy sources in Indian context.
DJ19MEC5012.4	Calculate and analyse utilization of solar and wind energy.
DJ19MEC5012.5	Illustrate design of biogas plant.
DJ19MEC5012.6	Explain basics of hydrogen energy

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DJ19MEC5013- Quality Engineering:

Learners will be able to:	
DJ19MEC5013.1	Explain the importance of Quality for survival and growth of any business.
DJ19MEC5013.2	Prepare and interpret the control charts for variables and attributes.
DJ19MEC5013.3	Evaluate Process capability and determine tolerance limits.
DJ19MEC5013.4	Apply ANOVA test and determine the degree of relation between independent variables.
DJ19MEC5013.5	Elaborate significance of quality and application of Six Sigma in service sector

DJ19IHL2 - Professional and Business Communication Laboratory

Learners will be able to:	
DJ19IHL2.1	Plan, organize and write technical documents like reports, proposals and research papers in the prescribed format using appropriate language and style with an understanding of ethics in written communication
DJ19IHL2.2	Apply techniques of writing resume, participating in a group discussion and facing interviews
DJ19IHL2.3	Develop interpersonal skills in professional and personal situations
DJ19IHL2.4	Understand the documentation process of meetings and conduct meetings in a professional manner
DJ19IHL2.5	Understand communication across cultures and work ethics
DJ19IHL2.6	Design and deliver effective presentations using Power Point

DJ19ILL1 - Innovative Product Development III

Learners will be able to:	
DJ19ILL1.1	Identify the requirement for a product based on societal/research needs.
DJ19ILL1.2	Apply knowledge and skills required to solve a societal need by conceptualizing a product, especially while working in a team.
DJ19ILL1.3	Use standard norms of engineering concepts/practices in the design and development of an innovative product.
DJ19ILL1.4	Draw proper inferences through theoretical/ experimental/simulations and analyse the impact of the proposed method of design and development of the product.
DJ19ILL1.5	Develop interpersonal skills, while working as a member of the team or as the leader.
DJ19ILL1.6	Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, which could eventually prepare themselves to be successful entrepreneurs.
DJ19ILL1.7	Demonstrate product/project management principles during the design and development work and also excel in written (Technical paper preparation) as

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TE. Sem VI (R2016): Course Outcomes

DJ19MEC601 & DJ19MEL601: Machine Design I

Learners will be able to:	
DJ19MEC601.1	1. Use design data books in designing various components.
DJ19MEC601.2	2. Illustrate basic principles of machine design.
DJ19MEC601.3	3. Demonstrate understanding of various design considerations, theories of failures, Standards/Codes.
DJ19MEC601.4	4. Design machine elements for static as well as dynamic loading.
DJ19MEC601.5	5. Design machine elements on the basis of strength/ rigidity concepts

DJ19MEC602 & DJ19MEL602- Refrigeration and Airconditioning

Learners will be able to:	
DJ19MEC602.1	Apply the fundamentals of thermodynamics to refrigeration systems and calculate the coefficient of performance of reversed Carnot cycle, Bell-Coleman cycle and
DJ19MEC602.2	Analyse the vapour compression refrigeration systems, components and interpret the importance of refrigerant properties and its selection criteria.
DJ19MEC602.3	Analyse the psychrometric properties, processes, charts and principles of air-conditioning.
DJ19MEC602.4	Design air-conditioning systems using cooling load calculations and duct design principles.
DJ19MEC602.5	Discuss the applications and controls of various refrigeration and air-conditioning systems

DJ19MEC603 & DJ19MEL603- Mechatronics

Learners will be able to:	
DJ19MEC603.1	Represent Mechatronics system with block diagrams
DJ19MEC603.2	Identify the suitable sensor and actuator for a given mechatronics system
DJ19MEC603.3	Distinguish and analyse various circuits for signal conditioning and their interfacing with microcontrollers
DJ19MEC603.4	Design hydraulic/pneumatic circuits
DJ19MEC603.5	Analyse continuous control logics (P, PI, PD and PID) for standard input conditions
DJ19MEC603.6	Develop ladder logic programming.

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DJ19MEC604 & DJ19MEL604: Power Engineering

Learners will be able to:	
DJ19MEC604.1	Understand working of different types of boilers and analyze steam generator, steam turbine performance.
DJ19MEC604.2	Explain basic concepts in the case of centrifugal compressors and analyze their performance.
DJ19MEC604.3	Describe working of axial flow compressors and analyze their performance.
DJ19MEC604.4	Explain basic difference between impulse and reaction water turbines, determine various parameters and design turbine runners.
DJ19MEC604.5	Describe operating principles of reciprocating and centrifugal pumps and evaluate their performance.

DJMEC6011 : Smart Materials

Learners will be able to:	
DJMEC6011.1	Understand working of smart materials and their application as actuator and sensor.
DJMEC6011.2	Select an appropriate smart material for a given application.
DJMEC6011.3	Identify applicability of smart materials for new prospective smart structures.

DJ19MEC6012- Design of Heat Exchanger Equipment:

Learners will be able to:	
DJ19MEC6012.1	1. Classify different HX and understand the methodologies for its design.
DJ19MEC6012.2	2. Design double pipe HX
DJ19MEC6012.3	3. Design SHTX
DJ19MEC6012.4	4. Design Compact HX

DJ19ILL2: : Innovative Product Development-IV

Learners will be able to:	
DJ19ILL2:1	Identify the requirement for a product based on societal/research needs
DJ19ILL2.2	Apply knowledge and skills required to solve a societal need by conceptualising a product, especially while working in a team
DJ19ILL2.3	Use standard norms of engineering concepts/practices in the design and development of an innovative product.
DJ19ILL2.4	Draw proper inferences through theoretical/ experimental/simulations and analyse the impact of the proposed method of design and development of the product.
DJ19ILL2.5	Develop interpersonal skills, while working as a member of theteam or as theleader.
DJ19ILL2.6	Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, which could eventually prepare themselves to be successful entrepreneurs.

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DJ19A5- Environmental Studies

Learners will be able to:	
DJ19A5.1.	Understand how human activities affect environment
DJ19A5.2	Understand the various technology options that can make a difference

B.Y B. TECH
Sem VII Course Outcomes

DJ19CEC701 & DJ19CEL701 - Digital Signal Processing and Applications

Learners will be able to:	
DJ19CEC701.1	Select appropriate gears for power transmission on the basis of given power and speed.
DJ19CEC701.2	Design gears based on the given conditions.
DJ19CEC701.3	Select bearings for a given application from the manufacturers catalogue.
DJ19CEC701.4	Design the flywheel for given applications.
DJ19CEC701.5	Design cam and follower mechanisms.

DJ19MEC702 & DJ19MEL702 : Production Planning and Control

Learners will be able to:	
DJ19CEC702.1	Demonstrate knowledge of the basic elements and concepts related to distributed system technologies
DJ19CEC702.2	Illustrate the middleware technologies that support distributed applications such as RPC, RMI and Object based middleware.
DJ19CEC702.3	Analyse the various techniques used for clock synchronization and mutual exclusion
DJ19CEC702.4	Demonstrate the concepts of Resource and Process management and synchronization algorithms
DJ19CEC702.5	Demonstrate the concepts of Consistency and Replication Management
DJ19CEC702.6	Apply the knowledge of Distributed File System to analyse various file systems like NFS, AFS and the experience in building large-scale distributed applications.

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DJ19MEC703 & DJ19MEL703: Finite Element Analysis

Learners will be able to:	
DJ19MEC703.1	Summarize the basics of finite element analysis.
DJ19MEC703.2	Evaluate differential equations using weak and Non-weak form methods.
DJ19MEC703 .3	Implement the basic finite element formulation techniques to solve one dimensional engineering problems using elements such as bar/beam/link
DJ19MEC703.4	Implement the basic finite element formulation techniques to solve two dimensional engineering problems using elements such as triangular and
DJ19MEC703.5	Implement the basic finite element formulation techniques to find natural frequency of dynamic system.
DJ19MEC703.6	Use commercial FEA software, to solve problems related to mechanical engineering.

DJ19MEC7011: Additive Manufacturing

Learners will be able to:	
DJ19MEC7011.1	Understand importance of Rapid Prototyping in product development.
DJ19MEC7011.2	Apply basic knowledge of additive manufacturing to decide type of additive manufacturing process and material according components design
DJ19MEC7011.3	To calculate and justify the cost of a typical additive manufacturing operation including labour costs, overhead costs, and consumable costs.
DJ19MEC7011.4	Evaluate the different post processing techniques used on AM parts, including those required for removal of support structures, improvement of surface
DJ19MEC7011.5	Conduct research work and research writing in the field of additive manufacturing

DJ19MEC7012: Computational Fluid Dynamics

Learners will be able to:	
DJ19MEC7012.1	Explain the working of a CFD code
DJ19MEC7012.2	Understand the various Governing Equations
DJ19MEC7012.3	Understand turbulence modelling and various algorithms used in numerical techniques
DJ19MEC7012.4	Apply Finite Volume Method to solve numerical problems
DJ19MEC7012.5	Understanding the software used for simulation of numerical problems

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DJ19MEC7013: Machine Health Monitoring Management

Learners will be able to:	
DJ19MEC7013.1	Understand basics of machine health monitoring management.
DJ19MEC7013.2	Apply basic Instrumentation and signal processing technique in machine health
DJ19MEC7013.3	Recognize pattern in problems involved in machine health monitoring.
DJ19MEC7013.4	Gain knowledge about the application of artificial intelligence techniques in Condition Monitoring
DJ19MEC7013.5	Gain knowledge about the application of Machine learning techniques in Condition Monitoring

DJ19MEC7014: Big Data Analytics

Learners will be able to:	
DJ19MEC7014.1	Understand the key issues in big data management.
DJ19MEC7014.2	Acquire fundamental enabling techniques using tools in big data analytics.
DJ19MEC7014.3	Achieve adequate perspectives of big data analytics in various applications like sensor, recommender systems, social media applications etc.

DJ19MEC7015- Robotics

Learners will be able to:	
DJ19MEC7015.1	Demonstrate the basic functioning of a robot
DJ19MEC7015.2	Identify various components of robots
DJ19MEC7015.3	Carryout kinematic analysis, workspace analysis, and trajectory planning for a robot
DJ19MEC7015.4	Identify suitable sensors/actuators for robot
DJ19MEC7015.5	Select an appropriate robot for given industrial inspection and material handling systems.

DJ19MEC7016 - Tribology

Learners will be able to:	
DJ19ILO7016.1	Apply the principles of lubrication, lubrication regimes, and theories of hydrodynamic, elastohydrodynamic and mixed / boundary lubrication.
DJ19ILO7016.2	Understand the principles of design considerations, principles of bearing selection and arrangement in machines.
DJ19ILO7016.3	Design of mechanical components from the aspect of friction, wear and lubrication.
DJ19ILO7016.4	Understand the principles for selecting compatible materials for minimizing friction and wear in machinery

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DJ19MEP704: Project – I

Learners will be able to:	
DJ19MEP704.1	Apply basic engineering fundamentals in the domain of practical applications.
DJ19MEP704.2	Identify the engineering problems based on literature review.
DJ19MEP704.3	Attempt a problem solution with systematic approach and ethics.
DJ19MEP704.4	Develop the habit of working in a team, and communicate efficiently with engineering community and society.
DJ19MEP704.5	Apply the principles of project management and financial aspects in multidisciplinary environments.
DJ19MEP704.6	Recognize the need for lifelong learning activities to cope up with technological changes.

DJ19MEC7016 : Automobile Engineering

Learners will be able to:	
DJ19ILO7016.1	To identify and describe present state of energy security and its importance
DJ19ILO7016.2	To identify and describe the basic principles and methodologies adopted in energy audit of a utility.
DJ19ILO7016.3	To describe the energy performance evaluation of some common electrical installations and identify the energy saving opportunities.
DJ19ILO7016.4	To describe the energy performance evaluation of some common thermal installations and identify the energy saving opportunities.
DJ19ILO7016.5	To analyze the data collected during performance evaluation and recommend energy saving measures.

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B.Y B. TECH

Sem VIII Course Outcomes

DJ19MEC801 & DJ19MEL801 - Design of Mechanical Systems

Learners will be able to:	
DJ19MEC801.1	Design gearboxes for a given machine tool application.
DJ19MEC801.2	Design hoisting mechanism of an Electric overhead traveling crane.
DJ19MEC801.3	Design belt conveyor systems.
DJ19MEC801.4	Design engine components such as cylinder, piston, connecting rod and crankshaft.
DJ19MEC801.5	Design pumps for a given application.

DJ19MEC802 & DJ19MEL802- Industrial Engineering

Learners will be able to:	
DJ19MEC802.1	Illustrate the need for optimization of resources and its significance.
DJ19MEC802.2	Develop ability in integrating knowledge of design along with other aspects of value addition in the conceptualization and manufacturing stage of various products.
DJ19MEC802.3	Demonstrate the concept of value analysis and its relevance.
DJ19MEC802.4	Manage and implement different concepts involved in method study and understanding of work content in different situations.
DJ19MEC802.5	Describe different aspects of work system design and facilities design pertinent to manufacturing industries.
DJ19MEC802.6	Illustrate concepts of Agile manufacturing, Lean manufacturing and Flexible manufacturing

DJ19MEC803 & DJ19MEL803- CAD/CAM/CIM

Learners will be able to:	
DJ19CEEC8012.1	Specify and evaluate software architectures.
DJ19CEEC8012.2	Select and use appropriate architectural styles.
DJ19CEEC8012.3	Select and use appropriate software design patterns.
DJ19CEEC8012.4	Understand and perform a design review with agile project architecture.

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DJ19MEC8011: **Smart Industries**

Learners will be able to:	
DJ19MEC8011.1	Understand the basic principles behind smart industry.
DJ19MEC8011.2	Identify smart industry key levers and drivers.
DJ19MEC8011.3	Understand the supporting technologies for Smart factories.
DJ19MEC8011.4	Learn from leading industries and develop smart factory roadmaps.

DJ19MEC8012: **Energy Audit and Management**

Learners will be able to:	
DJ19MEC8012.1	Know the present energy scenario, global environmental concern, and importance of sustainable energy management.
DJ19MEC8012.2	Analyze energy trends in energy intensive sectors and carry out energy action plan.
DJ19MEC8012.3	Understanding the energy economy of the energy intensive sectors.
DJ19MEC8012.4	Analyze the energy utilization in thermal and electrical utilities.
DJ19MEC8012.5	Evaluate the efficiency of boilers, steam systems, furnace, HVAC and refrigeration systems

DJ19MEC8013: Industrial Waste Management

Learners will be able to:	
DJ19MEC8013.1	. Know the sources of pollution from industries.
DJ19MEC8013.2	. Understand the characteristics of pollution.
DJ19MEC8013.3	Analyze the effects and hazardless of the industrial pollution.
DJ19MEC8013.4	Plan to minimize of industrial wastes.
DJ19MEC8013.5	Design facilities for the processing and reclamation of industrial waste water.

DJ19ILO8023 - Corporate Social Responsibility

Learners will be able to:	
DJ19ILO8023.1	Understand the key characteristics of Corporate Social Responsibility (CSR) in the context of present-day management.
DJ19ILO8023.2	Apprise regarding business decision-making which is informed by ethical values and respect for people communities and the environment.
DJ19ILO8023.3	Become aware of creating a strategic plan that enables an organization to reach out to its internal and external stakeholders with consistent messages.
DJ19ILO8023.4	Understand critical issues of Corporate Social Responsibility (CSR) in a cross-cultural setting
DJ19ILO8023.5	Interpret financial and legal aspect of a business.

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DJ19MEC8014 - Business Analytics

Learners will be able to:	
DJ19MEC8014 .1	Apply Base SAS programming.
DJ19MEC8014 .2	Understand and demonstrate visual analytics.
DJ19MEC8014 .3	Design the report using reporter
DJ19MEC8014 .4	View various reports using different media devices

DJ19MEC8015- IoT and Applications

Learners will be able to:	
DJ19MEC8015.1	Understanding of IoT value chain structure (device, data cloud), application areas and technologies involved.
DJ19MEC8015.2	Understand IoT sensors and technological challenges faced by IoT devices, with
DJ19MEC8015.3	Market forecast for IoT devices with a focus on sensors.
DJ19MEC8015.4	Explore and learn about Internet of Things with the help of preparing projects designed for Raspberry Pi.

DJ19MEC8016 - Process Equipment Design

Learners will be able to:	
DJ19MEC8016.1	Understand the basics of process equipment design
DJ19MEC8016.2	Design a reaction vessel to meet the given requirements
DJ19MEC8016.3	Design a storage tank as per industrial standards
DJ19MEC8016.4	Design a shell and tube heat exchanger for single phase heat transfer
DJ19MEC8016.5	Design vertical towers like distillation columns

DJ19MEC8017 - Motor Sports Engineering

Learners will be able to:	
DJ19MEC8017.1	Define selection criteria and specifications of metallic and non-metallic materials.
DJ19MEC8017 .2	Analyze modelling and simulation results with respect to structural responses behavior.
DJ19MEC8017.3	Distinguish the complex relationships between competition vehicle design aspects and competition vehicle performance.
DJ19MEC8017 .4	Evaluate the matching of engine, transmission, and vehicle chassis for motorsport applications.
DJ19MEC8017.5	Understand application of aerodynamics in motorsports.
DJ19MEC8017 .6	Design, evaluate and optimize data systems based on fundamental principles of electrical and digital information transfer.

Department of Mechanical Engineering

DJ19MEC8018- Advanced Quantitative Techniques

Learners will be able to:	
DJ19MEC8018.1	Explain significance of sensitivity analysis of LPP and perform sensitivity analysis on various parameters involved in LP model.
DJ19MEC8018.2	Recognize the limitations of simplex method in deriving integer solution to LPP and employ suitable algorithm to obtain integer solution.
DJ19MEC8018.3	Identify real-world problems as special cases of Linear Programming Problem and Solve the decision problem by choosing appropriate
DJ19MEC8018.4	Analyse various decision-making situations, outline decision alternatives and select the best alternative.
DJ19MEC8018.5	Describe a real-world problem as a Non-Linear Programming Problem and Distinguish local, global extreme points and point of inflection

DJ19MEP804 - Project – II

Learners will be able to:	
DJ19MEP804.1	1. Apply basic engineering fundamentals in the domain of practical applications.
DJ19MEP804.2	2. Identify, formulate and analyse the engineering problems based on literature review.
DJ19MEP804.3	3. Attempt a problem solution with systematic approach and ethics.
DJ19MEP804.4	4. Correlate the theoretical and experimental / simulations results and draw the proper inferences.
DJ19MEP804.5	5. Develop the habit of working in a team and communicate efficiently with engineering community and society.
DJ19MEP804.6	6. Recognize the need for lifelong learning activities to cope up with technological changes

Department of Mechanical Engineering

M. Tech. Semester I- Course Outcomes

Course: Computer Integrated Manufacturing Systems	**Course Code: DJS22MPGC101**
Students will be able to,	
DJS22MPGC101.1	Understand the basic principles of CIM and its elements
DJS22MPGC101.2	Distinguish different types of inspection methods.
DJS22MPGC101.3	Emphasise the importance of group technology and cellular manufacturing systems
DJS22MPGC101.4	Design automated material handling and storage systems for a typical production system
DJS22MPGC101.5	Understand the importance of data communications in CIM environment

Course: Quality Engineering	**Course Code: DJS22MPGC102**
Students will be able to,	
DJS22MPGC102.1	Demonstrate the understanding of modern quality concepts.
DJS22MPGC102.2	Demonstrate the understanding of statistical quality control charts.
DJS22MPGC102.3	Apply standard sampling plans.
DJS22MPGC102.4	Analyse modern management trends in quality improvement.
DJS22MPGC102.5	Apply concepts of TQM.

Course: New Product Design & Development	**Course Code: DJS22MPGC111**
Students will be able to,	
DJS22MPGC111.1	Understand the generic product design & development process, tools and methodologies.
DJS22MPGC111.2	Get familiarised with product life cycle & product life cycle assessment
DJS22MPGC111.3	Get familiarised with various software solutions and choose appropriate design approaches.
DJS22MPGC111.4	Understand product costing approach and economic feasibility of the product.
DJS22MPGC111.5	Get conversant with I.P rights & patenting procedure.

Course: Smart Materials	**Course Code: DJS22MPGC112**
Students will be able to,	
DJS22MPGC112.1	Understand working of smart materials and their application as actuator and sensor.
DJS22MPGC112.2	Select an appropriate smart material for a given application.
DJS22MPGC112.3	Identify applicability of smart materials for new prospective smart structures.

Department of Mechanical Engineering

M. Tech. Semester I- Course Outcomes

Course: World Class Manufacturing	**Course Code: DJS22MPGC113**
Students will be able to,	
DJS22MPGC113.1	Understand the relevance and basics of World Class Manufacturing.
DJS22MPGC113.2	Design and develop a roadmap for world class manufacturing
DJS22MPGC113.3	Meet the challenges that the Indian manufacturer's faces, as it evolves from a domestic to a world class global manufacturer status

Course: Manufacturing Planning and Control	**Course Code: DJS22MPGC121**
Students will be able to,	
DJS22MPGC121.1	Analyse various aspects of good manufacturing planning and control framework.
DJS22MPGC121.2	Design demand management scheme using demand forecasting methods and prepare aggregate plan.
DJS22MPGC121.3	Develop the plan for scheduling and sequencing of manufacturing operations
DJS22MPGC121.4	Create a logical approach to Line balancing in various production systems

Course: Reliability Engineering	**Course Code: DJS22MPGC122**
Students will be able to,	
DJS22MPGC122.1	Understand and apply the theory and laws of Probability to solve engineering problems.
DJS22MPGC122.2	Apply various reliability concepts to calculate different reliability parameters.
DJS22MPGC122.3	Estimate the system reliability of simple and complex systems and improve the reliability of system with various techniques
DJS22MPGC122.4	Apply the Reliability concepts in Maintenance of device/equipment.
DJS22MPGC122.5	Apply a Failure Mode Effect and Criticality method to carry out Reliability analysis.

Course: Micro and Nano manufacturing	**Course Code: DJS22MPGC123**
Students will be able to,	
DJS22MPGC123.1	Get an awareness of different techniques used in micro and nano manufacturing.
DJS22MPGC123.2	Get in-depth idea of the conventional techniques used in micro manufacturing.
DJS22MPGC123.3	Become aware about non-conventional micro-nano manufacturing and finishing approaches.
DJS22MPGC123.4	Get awareness on micro and nano finishing processes.
DJS22MPGC123.5	Understand micro and nanofabrication techniques and other processing routes in micro and nano manufacturing.
DJS22MPGC123.6	Know about different techniques used in micro joining and the metrology tools in micro and nano manufacturing.

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Course: Data Analytics	**Course Code: DJS22OPGC131**
Students will be able to,	
DJS22OPGC131.1	Interpret data using descriptive statistics.
DJS22OPGC131.2	Demonstrate sampling distributions and estimate statistical parameters.
DJS22OPGC131.3	Develop hypothesis based on data and perform testing using various statistical techniques
DJS22OPGC131.4	Perform analysis of variance on data.
DJS22OPGC131.5	Examine relations between data

Course: Journey from Intellectual Property to Patenting	**Course Code: DJS22OPGC132**
Students will be able to,	
DJS22OPGC132.1	Recognize the crucial role of IP for the purposes of product and technology development
DJS22OPGC132.2	Understand how and when to file a patent
DJS22OPGC132.3	Apply the knowledge to understand the entire ecosystem
DJS22OPGC132.4	Derive value from IP and leverage its value in new product and service development

Course: Cyber Security and Laws	**Course Code: DJS22OPGC133**
Students will be able to,	
DJS22OPGC133.1	Understand the distinct types of cybercrime and security issues E Business
DJS22OPGC133.2	Analyses distinct types of cyber threats and techniques for security management
DJS22OPGC133.3	Explore the legal requirements and standards for cyber security in various countries to regulate cyberspace
DJS22OPGC133.4	Impart the knowledge of Information Technology Act and legal framework of right to privacy, data security and data protection

Course: Agile Frameworks	**Course Code: DJS22OPGC134**
Students will be able to,	
DJS22OPGC134.1	Summarize the concepts of agile practices and business objectives.
DJS22OPGC134.2	Gain knowledge on the phases of agile development framework.
DJS22OPGC134.3	Have an exposure on the scaling factors and models to be developed for agile projects.
DJS22OPGC134.4	Acquire knowledge on the agile performance measurement.
DJS22OPGC134.5	Develop the product based on agile factors with risk mitigation.
DJS22OPGC134.6	Describe the role of agile in enterprise management and incremental delivery.

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Course: Design of Experiments	**Course Code: DJS22OPGC135**
Students will be able to,	
DJS22OPGC135.1	Plan data collection, to turn data into information and to make decisions that lead to appropriate action
DJS22OPGC135.2	Apply the methods taught to real life situations.
DJS22OPGC135.3	Plan, analyze, and interpret the results of experiments

Course: Operations Research	**Course Code: DJS22OPGC136**
Students will be able to,	
DJS22OPGC136.1	Convert a real-world problem in to a Linear Programming Problem and Interpret the solution obtained using Simplex method or other algorithms.
DJS22OPGC136.2	Understand reasons of formation of queues, Classify various queuing systems and Apply performance parameters defined for various queuing systems for decision making in real life situations.
DJS22OPGC136.3	Describe concept of simulation and Apply Monte Carlo Simulation technique to systems such as inventory, queuing and Develop solutions for them.
DJS22OPGC136.4	Solve the Game and explore the optimal strategies.
DJS22OPGC136.5	Identify the decision situations which vary with time and Analyze them using principle of dynamic programming to real life situations

Department of Mechanical Engineering

M. Tech. Semester II- Course Outcomes

Course: Industrial Automation	**Course Code:** DJS22MPGC201
Students will be able to,	
DJS22MPGC201.1	Students shall be able to understand the working of automation systems and shall acquire the insight to build the automation systems
DJS22MPGC201.2	Illustrates the use of PLC in Automation

Course: Advanced Quantitative Techniques	**Course Code: DJS22MPGC202**
Students will be able to,	
DJS22MPGC202.1	Explain significance of sensitivity analysis of LPP and Perform sensitivity analysis on various parameters involved in LP model.
DJS22MPGC202.2	Recognize the limitations of simplex method in deriving integer solution to LPP and Employ suitable algorithm to obtain integer solution
DJS22MPGC202.3	Analyse various decision-making situations, Outline decision alternatives and Select the best alternative
DJS22MPGC202.4	Describe a real-world problem as a Non-Linear Programming Problem and Distinguish local, global extreme points and point of inflection.
DJS22MPGC202.5	Explain significance of Markov Analysis to predict the state of a system

Course: Manufacturing Simulation Lab	**Course Code: DJS22MPGL203**
Students will be able to,	
DJS22MPGL203.1	Identify Understand, simulate and optimize the processes under consideration
DJS22MPGL203.2	Simulate and work for cost reduction in any given process

Course: Strategic Manufacturing for Sustainability	**Course Code: DJS22MPGC211**
Students will be able to,	
DJS22MPGC211.1	Identify and deal with economic, social and technological concerns in sustainable manufacturing front
DJS22MPGC211.2	Pursue eco-friendly approaches in managing various forms of waste including hazardous waste
DJS22MPGC211.3	Apply environment friendly options in design and manufacturing operations to bring down carbon foot prints
DJS22MPGC211.4	Get adequate exposure to energy efficient initiatives and energy management
DJS22MPGC211.5	Get exposure to environmental standards/legislations and develop capability in assessing environment impact

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Course: Additive Manufacturing and Rapid Prototyping	**Course Code: DJS22MPGC212**
Students will be able to,	
DJS22MPGC212.1	Understand importance of Rapid Prototyping in product development
DJS22MPGC212.2	Apply basic knowledge of additive manufacturing to decide type of additive manufacturing process and material according components design requirement
DJS22MPGC212.3	To calculate and justify the cost of a typical additive manufacturing operation including labour costs, overhead costs, and consumable costs
DJS22MPGC212.4	Evaluate the different post processing techniques used on AM parts, including those required for removal of support structures, improvement of surface characteristics and structural integrity
DJS22MPGC212.5	Conduct research work and research writing in the field of additive manufacturing

Course: Manufacturing Systems Design	**Course Code: DJS22MPGC213**
Students will be able to,	
DJS22MPGC213.1	Understand and appreciate the capabilities and limitations of various manufacturing systems
DJS22MPGC213.2	Identify and select appropriate manufacturing systems for specific applications.
DJS22MPGC213.3	Design and implement appropriate model of manufacturing systems in specific contexts
DJS22MPGC213.4	Cope up with the ongoing demands of the industry, specifically on the manufacturing front

Course: Logistics and Supply Chain Management	**Course Code: DJS22MPGC221**
Students will be able to,	
DJS22MPGC221.1	Demonstrate the functional strategy map of supply chain management.
DJS22MPGC221.2	Analyze the determinants of Supply Chain and Transportation networks design.
DJS22MPGC221.3	Demonstrate the need of coordination and sourcing decisions in supply chain
DJS22MPGC221.4	Understand pricing, revenue management and role of IT in supply chain
DJS22MPGC221.5	Understand various sustainability aspects of a supply chain

Course: Machine Health Monitoring Management	**Course Code: DJS22MPGC222**
Students will be able to,	
DJS22MPGC222.1	Understand basics of machine health monitoring management
DJS22MPGC222.2	Apply basic Instrumentation and signal processing technique in machine health monitoring management
DJS22MPGC222.3	Recognize pattern in problems involved in machine health monitoring
DJS22MPGC222.4	Gain knowledge about the application of artificial intelligence techniques in Condition monitoring.
DJS22MPGC222.5	Gain knowledge about the application of Machine learning techniques in Condition monitoring.

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Course: Smart Industries	**Course Code: DJS22MPGC223**
Students will be able to,	
DJS22MPGC223.1	Understand the basic principles behind smart industry
DJS22MPGC223.2	Identify smart industry key levers and drivers
DJS22MPGC223.3	Understand the supporting technologies for Smart factories
DJS22MPGC223.4	Learn from leading industries and develop smart factory roadmaps

Course: Machine Learning	**Course Code: DJS22OPGC231**
Students will be able to,	
DJS22OPGC231.1	Analyze the applications, which can use Machine Learning Techniques.
DJS22OPGC231.2	Understand and Apply regression, classification and clustering methods to the database
DJS22OPGC231.3	Interpret the difference between supervised and unsupervised learning methods
DJS22OPGC231.4	Understand the working of Reinforcement learning.
DJS22OPGC231.5	Understand basic concepts of Genetic Algorithms

Course: Renewable Energy	**Course Code: DJS22OPGC232**
Students will be able to,	
DJS22OPGC232.1	Identify sustainable energy solutions for sustainable development.
DJS22OPGC232.2	Analyze renewable energy resources availability and utilization.
DJS22OPGC232.3	Demonstrate competency in renewable systems analysis independently

Course: Digital Marketing	**Course Code: DJS22OPGC233**
Students will be able to,	
DJS22OPGC233.1	Apply B2B and B2C contexts to plan content marketing
DJS22OPGC233.2	Develop and measure impact of content that works well for your target audience.
DJS22OPGC233.3	Manage social media presence, and create effective content for each platform.
DJS22OPGC233.4	Optimize search engine presence through on-site and off-site activities, develop target keyword list, optimize website UX and design, and execute a link building campaign
DJS22OPGC233.5	Create, execute, and optimize an effective Ad campaign. Display and set up advertising works
DJS22OPGC233.6	Create an email marketing strategy, create and execute email campaigns, and measure the results

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Course: Project management	**Course Code: DJS22OPGC234**
Students will be able to,	
DJS22OPGC234.1	Assess a project by establishing a business case and accordingly prepare a project proposal.
DJS22OPGC234.2	Develop a project plan.
DJS22OPGC234.3	Identify task inter-dependencies, construct and analyze a network diagram
DJS22OPGC234.4	Monitor and control the performance of the project.
DJS22OPGC234.5	Demonstrate Team work and team spirit and resolve conflicts

Course: Research Methodology	**Course Code: DJS22OPGC235**
Students will be able to,	
DJS22OPGC235.1	Understand research concepts, types, significance and importance of research profile
DJS22OPGC235.2	Prepare a preliminary research design for projects in their subject matter areas
DJS22OPGC235.3	Accurately collect, analyze and report data.
DJS22OPGC235.4	Review and analyze research findings.
DJS22OPGC235.5	Prepare the research report

Course: Product Life Cycle Management	**Course Code: DJS22OPGC236**
Students will be able to,	
DJS22OPGC236.1	Gain knowledge about phases of PLM, PLM strategies and methodology for PLM feasibility study and PDM implementation
DJS22OPGC236.2	Illustrate various approaches and techniques for designing and developing products
DJS22OPGC236.3	Understand the need for Product Life Cycle Assessment (LCA) and Life Cycle Cost Analysis
DJS22OPGC236.4	Demonstrate the various PLM Applications, Modules, and virtual product development tools for components, machining and manufacturing plant.
DJS22OPGC236.5	Appreciate the significant effect of effective marketing strategies and integration of PLM with other business modules

Department of Computer Science and Engineering (Data Science)

S.E. Semester III: Course Outcomes

DJ19DSC301& DJ19DST301- Mathematics for Intelligent Systems and Mathematics for Intelligent Systems – Tutorial

Learners will be able to:	
DJ19DSC301.1	Analyze probability of random variable and probability distributions
DJ19DSC301.2	Demonstrate knowledge of linear algebra
DJ19DSC301.3	Apply concepts of matrix theory
DJ19DSC301.4	Demonstrate concepts of calculus
DJ19DSC301.5	Analyze different optimization techniques

DJ19DSC302 & DJ19DSL302- Data Structures and Algorithms and Data Structures and Algorithms Laboratory

Learners will be able to:	
DJ19DSC302.1	Implement various operations like searching, insertion, deletion, traversal, etc. on various data structures.
DJ19DSC302.2	Choose appropriate (efficient) sorting, searching and hashing technique for given problem and implement it.
DJ19DSC302.3	Choose appropriate (efficient) data structure and algorithm and apply them to solve specified problems.
DJ19DSC302.4	Evaluate and analyze the efficiency of algorithms based on time and space complexity.
DJ19DSC302.5	Formulate new solutions for given problems or improve existing one for better efficiency and optimization

DJ19DSC303 & DJ19DSL303- Foundations of Data and Foundations of Data Analysis Laboratory

Learners will be able to:	
DJ19DSC303.1	Apply visualization techniques to understand Data.
DJ19DSC303.2	Apply ETL and perform OLAP operation.
DJ19DSC303.3	Perform various techniques to improve quality of data.
DJ19DSC303.4	Apply appropriate feature engineering technique to prepare data for modelling.
DJ19DSC303.5	Apply Sampling techniques to sample data for modelling.

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DJ19DSC304 & DJ19DSL304- Database Management Systems and Database Management Systems Laboratory

Learners will be able to:	
DJ19DSC304 .1	Design an optimized database.
DJ19DSC304 .2	Create and populate a relational database and retrieve information from the database by formulating SQL queries
DJ19DSC304 .3	Explain the concepts of transaction, concurrency and recovery.
DJ19DSC304 .4	Apply indexing mechanisms for efficient retrieval of information from database

DJ19DSC305 & DJ19DSL305- Statistics for Data Science and Statistics for Data Science Laboratory

Learners will be able to:	
DJ19DSC305.1	. Interpret data using descriptive statistics
DJ19DSC305.2	Demonstrate sampling distributions and estimate statistical parameters
DJ19DSC305.3	Develop hypothesis based on data and perform testing using various statistical techniques.
DJ19DSC305.4	Perform analysis of variance on data
DJ19DSC305.5	Examine relations between data

DJ19DSL306- Programming with Python Laboratory

Learners will be able to:	
DJ19DSL306.1	Demonstrate basic data types and data structures in python.
DJ19DSL306.2	Demonstrate the concepts of Object-oriented programming.
DJ19DSL306.3	Apply file, directory handling and text processing concepts in python.
DJ19DSL306.4	Apply database connectivity, client-server communication using python.
DJ19DSL306.5	Apply various advance modules of Python for data analysis.

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DJ19A2- Innovative Product Development-I

Learners will be able to:	
DJ19A2.1	Identify the requirement for a product based on societal/research needs.
DJ19A2.2	Apply knowledge and skills required to solve a societal need by conceptualizing a product, especially while working in a team.
DJ19A2.3	Use standard norms of engineering concepts/practices in the design and development of an innovative product.
DJ19A2.4	Draw proper inferences through theoretical/ experimental/simulations and analyzed the impact of the proposed method of design and development of the product.
DJ19A2.5	Develop interpersonal skills, while working as a member of the team or as the leader.
DJ19A2.6	Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, which could eventually prepare themselves to be successful entrepreneurs.
DJ19A2.7	Demonstrate product/project management principles during the design and development work and also excel in written (Technical paper preparation) as well as oral communication.

DJ19A3- Constitution of India

Learners will be able to:	
DJ19A3.1	Have general knowledge and legal literacy and thereby to take up competitive examinations.
DJ19A3.2	Understand state and central policies, fundamental duties.
DJ19A3.3	Understand Electoral Process, special provisions.
DJ19A3.4	Understand powers and functions of Municipalities, Panchayat's and Co- operative Societies,
DJ19A3.5	Understand Engineering ethics and responsibilities of Engineers
DJ19A3.6	Understand Engineering Integrity & Reliability

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SE Semester IV-Course Outcome

DJ19DSC401 & DJ19DSL401- Programming Language Principles and Programming Language Principles Laboratory

Learners will be able to:	
DJ19DSC401.1	Compare different programming paradigms with their design issues.
DJ19DSC401.2	Apply client and server-side scripting to develop applications.
DJ19DSC401.3	Illustrate system programming concepts

DJ19DSC402 & DJ19DSL402 - Machine Learning –I and Machine Learning - I Laboratory

Learners will be able to:	
DJ19DSC402.1	Classify given problems into classification, clustering and regression problems
DJ19DSC402.2	Apply machine learning techniques for a given problem
DJ19DSC402.3	Examine the dataset, choose appropriate algorithm and evaluate the results.
DJ19DSC402.4	Design applications using machine learning algorithms

DJ19DSC403 & DJ19DSL403- System Fundamentals and System Fundamentals Laboratory

Learners will be able to:	
DJ19DSC403.1	Describe the fundamental organization of a computer system.
DJ19DSC403.2	Apply appropriate memory mapping, process scheduling and disk scheduling methods.
DJ19DSC403.3	Identify the need of concurrency and apply appropriate method to solve the concurrency or deadlock problem.
DJ19DSC403.4	Differentiate between various processor architecture.

DJ19DSC404 & DJ19DSL404- Design and Analysis of Algorithms and Design and Analysis of Algorithms Laboratory

Learners will be able to:	
DJ19DSC404.1	Analyze the performance of algorithms using asymptotic analysis.
DJ19DSC404.2	Solve the problem using appropriate algorithmic design techniques.
DJ19DSC404.3	Able to prove that certain problems are NP-Complete.

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DJ19IHC1& DJ19IHT1- Universal Human Values and Universal Human Values Tutorial

Learners will be able to:	
DJ19IHC1.1	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
DJ19IHC1.2	Become sensitive to their commitment towards what they have understood (human values, human relationship, and human society).
DJ19IHC1.3	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.

DJ19DSL405 - Web Engineering Laboratory

Learners will be able to:	
DJ19DSL405.1	Design a website as per the requirements.
DJ19DSL405.2	Apply the concepts of cloud computing to improve the efficiency of web development.
DJ19DSL405.3	Evaluate the requirement of the problem and select appropriate method of web development

DJ19A4 Innovative Product Development-II

Learners will be able to:	
DJ19A4.1	Identify the requirement for a product based on societal/research needs.
DJ19A4.2	Apply knowledge and skills required to solve a societal need by conceptualizing a product, especially while working in a team.
DJ19A4.3	Use standard norms of engineering concepts/practices in the design and development of an innovative product.
DJ19A4.4	Draw proper inferences through theoretical/ experimental/simulations and analyzed the impact of the proposed method of design and development of the product.
DJ19A4.5	Develop interpersonal skills, while working as a member of the team or as thel eader.
DJ19A4.6	Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, which could eventually prepare themselves to be successful entrepreneurs.
DJ19A4.7	Demonstrate product/project management principles during the design and development work and also excel in written (Technical paper preparation) as well as oral communication.

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TE Semester V-Course Outcome

DJ19DSC501 & DJ19DSL501- Machine Learning -II (Deep Learning) & Machine Learning -II Laboratory

Learners will be able to:	
DJ19DSC501.1	Analyze different neural network architectures and their learning algorithms.
DJ19DSC501.2	Implement deep network training and design concepts.
DJ19DSC501.3	Build solution using appropriate neural network models.
DJ19DSC501.4	Illustrate performance of deep learning models using Explainable AI.

DJ19DSC502 & DJ19DSL502 - Artificial Intelligence & Artificial Intelligence Laboratory

Learners will be able to:	
DJ19DSC502.1	Classify given problem and identify the need of intelligent agent.
DJ19DSC502.2	Apply appropriate search-based method for a given problem.
DJ19DSC502.3	Analyze various AI approaches to knowledge– intensive problem solving, reasoning and planning.
DJ19DSC502.4	Design an expert system for a given AI problem.

DJ19DSC503 & DJ19DSL503- Information Security & Information Security Laboratory

Learners will be able to:	
DJ19DSC503.1	Illustrate fundamentals of network design and cryptography.
DJ19DSC503.2	Apply appropriate algorithms to ensure Information security during data transmission.
DJ19DSC503.3	Identify various security vulnerabilities in an existing system.

DJ19DSL504 - JAVA and Scala Laboratory

Learners will be able to:	
DJ19DSL504.1	Implement Java and Scala program to provide solution for a given Problem.
DJ19DSL504.2	Select suitable programming language depending on the scalability of an application.

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DJ19DSC5011& DJ19DSL5011 - Distributed Computing & Distributed Computing Laboratory

Learners will be able to:	
DJ19DSC5011.1	Demonstrate Interprocess Communication and Synchronization in a Distributed System.
DJ19DSC5011.2	Apply appropriate Resource, Process management, File and Memory technique in a given Distributed Environment for efficient processing.
DJ19DSC5011.3	Apply suitable methods to improve data availability in a system.

DJ19DSC5012 & DJ19DSL5012 - Time Series Analysis & Time Series Analysis Laboratory

Learners will be able to:	
DJ19DSC5012.1	Interpret a correlogram and a sample spectrum.
DJ19DSC5012.2	Apply appropriate model for a time series dataset.
DJ19DSC5012.3	Compute forecasts for a variety of linear and non-linear methods and models.

DJ19DSC5013 & DJ19DSL5013 - Digital System Design & Digital System Design Laboratory

Learners will be able to:	
DJ19DSC5013.1	Explain different digital codes and their conversions.
DJ19DSC5013.2	Minimize logic expressions using various reduction techniques
DJ19DSC5013.3	Analyze and design combinational logic circuits.
DJ19DSC5013.4	Design flip-flops using logic gates and use them to realize different sequential circuits
DJ19DSC5013.5	Classify different programmable logic devices.

DJ19DSC5014 & DJ19DSL5014 - Probabilistic Graph Models & Probabilistic Graph Models

Learners will be able to:	
DJ19DSC5014.1	Explain the basic fundamentals of probabilistic graph theory.
DJ19DSC5014.2	Illustrate various principles of graph theory and algorithms.
DJ19DSC5014.3	Integrate core theoretical knowledge of graph theory to solve problems.

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DECL505 - Environmental Studies

Learners will be able to:	
DECL505.1	Understand how human activities affect environment .
DECL505.12	Understand the various technology options that can make a difference

DJ19CEL506 - Innovative Product Development - III

Learners will be able to:	
DJ19CEL506.1	Identify the requirement for a product based on societal/research needs.
DJ19CEL506.2	Apply knowledge and skills required to solve a societal need by conceptualizing a product, especially while working in a team.
DJ19CEL506.3	Use standard norms of engineering concepts/practices in the design and development of an innovative product.
DJ19CEL506.4	Draw proper inferences through theoretical/ experimental/simulations and analyze the impact of the proposed method of design and development of the product.
DJ19CEL506.5	Develop interpersonal skills, while working as a member of the team or as the leader.
DJ19CEL506.6	Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, which could eventually prepare themselves to be successful entrepreneurs.
DJ19CEL506.7	Demonstrate product/project management principles during the design and development work and also excel in written (Technical paper preparation) as well as oral communication.

Department of Artificial Intelligence and Machine Learning

Sem- III **Academic Year 2022-23**

Engineering Mathematics - III (DJ19AMC301)

Sr.No	CO's
DJ19AMC301.1	Learn the basic notation of vector spaces and subspaces.
DJ19AMC301.2	Apply the concept of vector spaces using linear transformations which is used in computer graphics and inner product spaces.
DJ19AMC301.3	Apply the concepts of eigenvalue and eigenvectors and diagonalization in linear systems
DJ19AMC301.4	Expand the periodic function by using Fourier series and complex form of Fourier series.
DJ19AMC301.5	Apply the concept of Linear & Non-Linear Programming Problem to the engineering problems.

Data Structures (DJ19AMC302)

Sr.No	CO's
DJ19AMC302.1	Understanding the fundamental analysis and time complexity for a given problem.
DJ19AMC302.2	Articulate linear and non-linear data structures and operations permitted on them.
DJ19AMC302.3	Applying a suitable algorithm for searching and sorting.
DJ19AMC302.4	Understanding the importance of hashing.
DJ19AMC302.5	Application of appropriate data structures to find solutions to practical problem

Database Management Systems (DJ19AMC303)

Sr.No	CO's
DJ19AMC303.1	Demonstrate ER modeling and Relational mapping to construct a database for given reallife problems and apply normalization to it. ·
DJ19AMC303.2	Construct SQL queries to perform operations on the database.
DJ19AMC303.3	Examine transaction processing and recovery mechanisms on a database.
DJ19AMC303.4	To understand various advanced databases and design an application using them.

Department of Artificial Intelligence and Machine Learning

Discrete Structures (DJ19AMC304)

Sr.No	CO's
DJ19AMC304.1	Verify the correctness of an argument using propositional and predicate logic andtruth tables.
DJ19AMC304.2	Understand relations, Diagraph and lattice, functions.
DJ19AMC304.3	Apply principles and concepts of graph theory in practical situations.
DJ19AMC304.4	Demonstrate the ability to solve problems using counting techniques and combinatory in the context of discrete probability
DJ19AMC304.5	Understand the different Algebraic structures and demonstrate use of groups and codes in Encoding and Decoding

Operating Systems (DJ19AMC305)

Sr.No	CO's
DJ19AMC305.1	Understand role of Operating System in terms of process, memory, file and I/O management.
DJ19AMC305.2	Apply appropriate process scheduling and Thread management.
DJ19AMC305.3	Identify the need of concurrency and apply appropriate method to solve the concurrency or deadlock problem.
DJ19AMC305.4	Apply and analyse different techniques of memory, file and I/O management.

Programming Laboratory – I (Python Programming) (DJ19AML306)

Sr.No	CO's
DJ19AMC306.1	Understand basic and object-oriented concepts, data structure implementation in python.
DJ19AMC306.2	Apply file, directory handling and text processing concepts in python.
DJ19AMC306.3	Apply database connectivity, client-server communication using python.
DJ19AMC306.4	Develop python-based application (web/Desktop) using Django web framework/Tkinter.

Department of Artificial Intelligence and Machine Learning

Innovative Product Development-I (DJ19A2)

Sr.No	CO's
DJ19A2.1	Identify the requirement for a product based on societal/research needs.
DJ19A2.2	Apply knowledge and skills required to solve a societal need by conceptualising a product, especially while working in a team.
DJ19A2.3	Use standard norms of engineering concepts/practices in the design and development of an innovative product.
DJ19A2.4	Draw proper inferences through theoretical/ experimental/simulations and analyse the impact of the proposed method of design and development of the product.
DJ19A2.5	Develop interpersonal skills, while working as a member of the team or as the leader.
DJ19A2.6	Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, which could eventually prepare themselves to be successful entrepreneurs.
DJ19A2.7	Demonstrate product/project management principles during the design and development work and also excel in written (Technical paper preparation) as well as oral communication

Constitution of India (DJ19A3)

Sr.No	CO's
DJ19A3.1	Have general knowledge and legal literacy and thereby to take up competitive examinations.
DJ19A3.2	Understand state and central policies, fundamental duties.
DJ19A3.3	Understand Electoral Process, special provisions.
DJ19A3.4	Understand powers and functions of Municipalities, Panchayats and Co-Operative Societies,
DJ19A3.5	Understand Engineering ethics and responsibilities of Engineers

Department of Artificial Intelligence and Machine Learning

Sem-IV **Academic Year 2022-23**

Statistics for Engineers (DJ19AMC401)

Sr.No	CO's
DJ19AMC401.1	Interpret data using descriptive statistics.
DJ19AMC401.2	Demonstrate sampling distributions and estimate statistical parameters.
DJ19AMC401.3	Develop hypothesis based on data and perform testing using various statistical techniques
DJ19AMC401.4	Perform analysis of variance on data.
DJ19AMC401.5	Examine relations between data.

Artificial Intelligence (DJ19AMC402)

Sr.No	CO's
DJ19AMC402.1	Classify given problem and identify the need of intelligent agent.
DJ19AMC402.2	Apply appropriate search-based method for a given problem.
DJ19AMC402.3	Analyze various AI approaches to knowledge– intensive problem solving, reasoning and planning.
DJ19AMC402.4	Design an expert system for a given AI problem

Machine Learning – I (DJ19AMC403)

Sr.No	CO's
DJ19AMC403.1	Classify given problems into classification, clustering and regression problems
DJ19AMC403.2	Apply machine learning techniques for a given problem
DJ19AMC403.3	Examine the dataset, choose appropriate algorithm and evaluate the results
DJ19AMC403.4	Design applications using machine learning algorithms

Department of Artificial Intelligence and Machine Learning

Computer Networks and Security (DJ19AMC404)

Sr.No	CO's
DJ19AMC404.1	Understand the concepts of data communication and functionalities of ISO - OSI model & TCP/IP model.
DJ19AMC404.2	Illustrate the functions of Data link layer.
DJ19AMC404.3	Implement and simulate the working of network layer and networking protocols.
DJ19AMC404.4	Demonstrate the working of transport and application layer protocols
DJ19AMC404.5	Identify security vulnerabilities and explore various monitoring measures.
DJ19AMC404.6	Explore the fundamentals of security algorithms

Programming Laboratory-II (Java and advanced Java Programming) (DJ19AML405)

Sr.No	CO's
DJ19AMC405.1	Develop applications by applying SOLID principles as well as appropriate ObjectOriented concepts and APIs.
DJ19AMC405.2	Debug a given code, rectify the errors to get the desired output.
DJ19AMC405.3	Make suitable modifications to programs as per user requirements for solving real world problems.
DJ19AMC405.4	Develop GUI applications using modern APIs (JAVAFX, swings, etc.)

Universal Human Values (DJ19IHC1)

Sr.No	CO's
DJ19IHC1.1	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.
DJ19IHC1.2	Become sensitive to their commitment towards what they have understood (human values, human relationship, and human society).
DJ19IHC1.3	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.

Department of Artificial Intelligence and Machine Learning

Innovative Product Development-II(DJ19A4)

Sr.No	CO's
DJ19A4.1	Identify the requirement for a product based on societal/research needs.
DJ19A4.2	Apply knowledge and skills required to solve a societal need by conceptualising a product, especially while working in a team.
DJ19A4.3	Use standard norms of engineering concepts/practices in the design and development of an innovative product.
DJ19A4.4	Draw proper inferences through theoretical/ experimental/simulations and analyse the impact of the proposed method of design and development of the product.
DJ19A4.5	Develop interpersonal skills, while working as a member of theteam or as theleader.
DJ19A4.6	Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, which could eventually prepare themselves to be successful entrepreneurs.
DJ19A4.7	Demonstrate product/project management principles during the design and development work and also excel in written (Technical paper preparation) as well as oral communication.

DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE
S.Y. BTECH

Semester III Course Outcomes

DJ19ADC301 & DJ19ADT 301 Engineering Mathematics – III

On completion of the course, learner will be able to:	
DJ19ADC301.1	Learn the basic notation of vector spaces and subspaces.
DJ19ADC301.2	Apply the concept of vector spaces using linear transformations which is used in computer graphics and inner product spaces.
DJ19ADC301.3	Apply the concepts of eigenvalue and eigenvectors and diagonalization in linear systems.
DJ19ADC301.4	Expand the periodic function by using Fourier series and complex form of Fourier series.
DJ19ADC301.5	Apply the concept of Linear & Non-Linear Programming Problem to the engineering problems.

DJ19ADC302 & DJ19ADL302 Data Structures and Algorithms

On completion of the course, learner will be able to:	
DJ19ADC302.1	Understanding the fundamental analysis and time complexity for a given problem
DJ19ADC302.2	Articulate linear and non-linear data structures and operations permitted on them.
DJ19ADC302.3	Applying a suitable algorithm for searching and sorting.
DJ19ADC302.4	Understanding the importance of hashing.
DJ19ADC302.5	Application of appropriate data structures to find solutions to practical problems.

DJ19ADC303 & DJ19ADL303 Database Management Systems

On completion of the course, learner will be able to:	
DJ19ADC303.1	Construct SQL queries to perform operations on database.
DJ19ADC303.2	Demonstrate appropriate transaction recovery techniques for a given problem.
DJ19ADC303.3	Design an application using advanced database.

DJ19ADC304 & DJ19ADT304 Discrete Structures

On completion of the course, learner will be able to:	
DJ19ADC304.1	Verify the correctness of an argument using propositional and predicate logic and truth tables.
DJ19ADC304.2	Understand relations, Diagraph and lattice, functions
DJ19ADC304.3	Apply principles and concepts of graph theory in practical situations.
DJ19ADC304.4	Demonstrate the ability to solve problems using counting techniques and combinatorics in the context of discrete probability.
DJ19ADC304.5	Understand the different Algebraic structures and demonstrate use of groups and codes in Encoding and Decoding.

DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE

DJ19ADC305 & DJ19ADL305 Operating System

On completion of the course, learner will be able to:	
DJ19ADC305.1	Describe the fundamental organization of a computer system.
DJ19ADC305.2	Apply appropriate memory mapping, process scheduling and disk scheduling methods.
DJ19ADC305.3	Identify the need of concurrency and apply appropriate method to solve the concurrency or deadlock problem.
DJ19ADC305.4	Differentiate between various processor architectures.

DJ19ADL306 Programming Laboratory – I (Python Programming)

On completion of the course, learner will be able to:	
DJ19ADL306.1	Understand basic and object-oriented concepts, data structure implementation in python.
DJ19ADL306.2	Apply file, directory handling and text processing concepts in python.
DJ19ADL306.3	Apply database connectivity, client-server communication using python.
DJ19ADL306.4	Develop python-based application (web/Desktop) using Django web framework/Tkinter.

DJ19A2 Innovative Product Development-I

On completion of the course, learner will be able to:	
DJ19A2.1	Identify the requirement for a product based on societal/research needs.
DJ19A2.2	Apply knowledge and skills required to solve a societal need by conceptualising a product, especially while working in a team. Use standard norms of engineering concepts/practices in the design and development of an innovative product.
DJ19A2.3	Draw proper inferences through theoretical/ experimental/simulations and analyse the impact of the proposed method of design and development of the product.
DJ19A2.4	Develop interpersonal skills, while working as a member of the team or as the leader.
DJ19A2.5	Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, which could eventually prepare themselves to be successful entrepreneurs.
DJ19A2.6	Demonstrate product/project management principles during the design and development work and also excel in written (Technical paper preparation) as well as oral communication

DJ19A3 Constitution of India

On completion of the course, learner will be able to:	
DJ19A3.1	Have general knowledge and legal literacy and thereby to take up competitive examinations. Understand state and central policies, fundamental duties.
DJ19A3.2	Understand Electoral Process, special provisions.
DJ19A3.3	Understand powers and functions of Municipalities, Panchayats and Co-Operative Societies,
DJ19A3.4	Understand Engineering ethics and responsibilities of Engineers
DJ19A3.5	Understand Engineering Integrity & Reliability

DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE
Semester IV Course Outcomes

DJ19ADC401 & DJ19ADL401 Statistics for Engineers

On completion of the course, learner will be able to:	
DJ19ADC401.1	Interpret data using descriptive statistics.
DJ19ADC401.2	Demonstrate sampling distributions and estimate statistical parameters.
DJ19ADC401.3	Develop hypothesis based on data and perform testing using various statistical techniques.
DJ19ADC401.4	Perform analysis of variance on data
DJ19ADC401.5	Examine relations between data.

DJ19ADC402 & DJ19ADL402 Artificial Intelligence

On completion of the course, learner will be able to:	
DJ19ADC402.1	Classify given problem and identify the need of intelligent agent.
DJ19ADC402.2	Apply appropriate search-based method for a given problem.
DJ19ADC402.3	Analyze various AI approaches to knowledge– intensive problem solving, reasoning and planning.
DJ19ADC402.4	Design an expert system for a given AI problem.

DJ19ADC403 & DJ19ADL403 Foundation of Data Science

On completion of the course, learner will be able to:	
DJ19ADC403.1	Understand data lake and data warehouse fundamentals.
DJ19ADC403.2	Understand ETL process and apply OLAP operations
DJ19ADC403.3	Apply appropriate pre-processing and visualization techniques.
DJ19ADC403.4	Design and evaluate predictive and descriptive models.

DJ19ADC404 & DJ19ADL404 Computer Networks and Security

On completion of the course, learner will be able to:	
DJ19ADC404.1	Understand the concepts of data communication and functionalities of ISO - OSI model & TCP/IP model
DJ19ADC404.2	Illustrate the functions of Data link layer
DJ19ADC404.3	Implement and simulate the working of network layer and networking protocols.
DJ19ADC404.4	Demonstrate the working of transport and application layer protocols
DJ19ADC404.5	Identify security vulnerabilities and explore various monitoring measures.
DJ19ADC404.6	Explore the fundamentals of security algorithms

DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE

DJ19ADL405 Programming Laboratory – II (Java)

On completion of the course, learner will be able to:	
DJ19ADL405.1	Develop applications by applying SOLID principles as well as appropriate Object Oriented concepts and APIs.
DJ19ADL405.2	Debug a given code, rectify the errors to get the desired output.
DJ19ADL405.3	Make suitable modifications to programs as per user requirements for solving real world problems.
DJ19ADL405.4	Develop GUI applications using modern APIs (JAVAFX, swings, etc.)
DJ19ADL405.5	Work effectively as a member of a team.

DJ19IHC1 Universal Human Values

On completion of the course, learner will be able to:	
DJ19IHC1.1	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.
DJ19IHC1.2	Become sensitive to their commitment towards what they have understood (human values, human relationship, and human society).
DJ19IHC1.3	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

DJ19A4 Innovative Product Development-II

On completion of the course, learner will be able to:	
DJ19A4.1	Identify the requirement for a product based on societal/research needs.
DJ19A4.2	Apply knowledge and skills required to solve a societal need by conceptualising a product, especially while working in a team. Use standard norms of engineering concepts/practices in the design and development of an innovative product.
DJ19A4.3	Draw proper inferences through theoretical/ experimental/simulations and analyse the impact of the proposed method of design and development of the product.
DJ19A4.4	Develop interpersonal skills, while working as a member of the team or as the leader.
DJ19A4.5	Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, which could eventually prepare themselves to be successful entrepreneurs.
DJ19A4.6	Demonstrate product/project management principles during the design and development work and also excel in written (Technical paper preparation) as well as oral communication

DEPARTMENT of COMPUTER SCIENCE ENGINEERING
(Io T, Cybersecurity and Blockchain)

Academic Term: June 2022 – Dec 2023

Course: - Mathematics-III Course Code: DJ19ICC301

Year/Semester: SE/III Course Credits: 4

	Course Outcome
DJ19ICC301.1	Analyze the algorithms based on time and space complexity.
DJ19ICC301.2	Apply the concept of vector spaces using linear transformations which is used in computer graphics and inner product spaces.
DJ19ICC301.3	Apply the concepts of eigenvalue and eigenvectors and diagonalization in linear systems.
DJ19ICC301.4	Apply the concept of Linear & Non-Linear Programming Problem to the engineering problems.
DJ19ICC301.5	Expand the periodic function by using Fourier series and complex form of Fourier series.

Course: - Data Structures Course Code: DJ19ICC302

Year/Semester: SE/III Course Credits: 4

	Course Outcome
DJ19ICC302.1	Analyze the algorithms based on time and space complexity.
DJ19ICC302.2	Solve the problem using appropriate data structure
DJ19ICC302.3	Implement appropriate searching algorithm for a given problem.
DJ19ICC302.4	Implement appropriate sorting algorithm for a given problem

Course: - Database Management Systems Course Code: DJ19ICC303

Year/Semester: SE/III Course Credits: 4

	Course Outcome
DJ19ICC303.1	Demonstrate ER modeling and Relational mapping to construct a database for given real-life problems and apply normalization to it.
DJ19ICC303.2	Construct SQL queries to perform operations on the database.
DJ19ICC303.3	Examine transaction processing and recovery mechanisms on a database.
DJ19ICC303.4	To understand various advanced databases and design an application using them.

DEPARTMENT of COMPUTER SCIENCE ENGINEERING
(Io T, Cybersecurity and Blockchain)

Course: - Discrete Structures Course Code: DJ19ICC304

Year/Semester: SE/III Course Credits: 4

	Course Outcome
DJ19ICC304.1	Verify the correctness of an argument using propositional and predicate logic and truth tables.
DJ19ICC304.2	Understand relations, Diagraph and lattice, functions.
DJ19ICC304.3	Apply principles and concepts of graph theory in practical situations.
DJ19ICC304.4	Demonstrate the ability to solve problems using counting techniques and combinatorics in the context of discrete probability.
DJ19ICC304.5	Understand the different Algebraic structures and demonstrate use of groups and codes in Encoding and Decoding.

Course: - Digital Logic Design and Applications Course Code: DJ19ICC305

Year/Semester: SE/III Course Credits: 4

	Course Outcome
DJ19ICC305.1	Understand different number systems and their conversions.
DJ19ICC305.2	Analyze and minimize Boolean expressions.
DJ19ICC305.3	Design and analyze combinational circuits.
DJ19ICC305.4	Design and analyze sequential circuits
DJ19ICC305.5	Design and analyze counters and registers.
DJ19ICC305.6	Understand programming logic devices.

Course: - Statistics for Engineers Course Code: DJ19ICC401

Year/Semester: SE/IV Course Credits: 4

	Course Outcome
DJ19ICC401.1	Interpret data using descriptive statistics.
DJ19ICC401.2	Demonstrate sampling distributions and estimate statistical parameters.
DJ19ICC401.3	Demonstrate sampling distributions and estimate statistical parameters.
DJ19ICC401.4	Perform analysis of variance on data.
DJ19ICC401.5	Examine relations between data.

DEPARTMENT of COMPUTER SCIENCE ENGINEERING
(Io T, Cybersecurity and Blockchain)

Course: - Operating Systems Course Code: DJ19ICC402

Year/Semester: SE/IV Course Credits: 4

	Course Outcome
DJ19ICC402.1	Describe the various operating systems architectures.
DJ19ICC402.2	Apply appropriate memory management, process scheduling and disk scheduling methods.
DJ19ICC402.3	Identify the need of concurrency and apply appropriate method to solve the concurrency or deadlock problem.
DJ19ICC402.4	Differentiate between various IoT operating system architectures.

Course: - Computer Networks Course Code: DJ19ICC403

Year/Semester: SE/IV Course Credits: 4

	Course Outcome
DJ19ICC403.1	Demonstrate the concepts of data communication at physical layer and compare ISO - OSI model & TCP/IP model.
DJ19ICC403.2	Demonstrate the working of networking protocols at data link layer.
DJ19ICC403.3	Design of network using wired and wireless LAN.
DJ19ICC403.4	Compare and analyze the performance of various routing protocols.
DJ19ICC4035	Compare and analyze the transport layer protocols and various congestion control algorithms.
DJ19ICC403.6	Explore various IoT protocols at application layer.

DEPARTMENT of COMPUTER SCIENCE ENGINEERING
(Io T, Cybersecurity and Blockchain)

Course: - Analysis of Algorithms Course Code: DJ19ICC404

Year/Semester: SE/IV Course Credits: 4

	Course Outcome
DJ19ICC404.1	Analyze running time and space complexity of an algorithm.
DJ19ICC404.2	Apply and analyze divide and conquer strategy to solve problems.
DJ19ICC404.3	Apply the concept of Greedy method to solve all feasible solutions of problems.
DJ19ICC404.4	Apply the concept of dynamic programming strategy to find optimal solution of problem.
DJ19ICC404.5	Understand the concepts of backtracking, branch and bound to represent solution by state space tree.
DJ19ICC404.6	Understand and Apply string matching techniques.

Course: Introduction to IoT Course Code: DJ19ICC405

Year/Semester: SE/IV Course Credits: 4

	Course Outcome
DJ19ICC405.1	Describe applications in areas of IoT using sensors and actuators.
DJ19ICC405.2	Explain working principle of sensors for measurement of physical quantities.
DJ19ICC405.3	Get hand-on exposure to different IoT processors and controller.
DJ19ICC405.4	Develop and deploy IoT system prototype with enhanced IoT Technologies.
DJ19ICC405.5	Use IoT communication models and protocols.
DJ19ICC405.6	Design and develop small IoT applications to create smart objects.

DEPARTMENT of COMPUTER SCIENCE ENGINEERING
(Io T, Cybersecurity and Blockchain)

Course: Programming Laboratory II Java and Advanced Java Programming
Course Code: DJ19ICC406

Year/Semester: SE/IV Course Credits: 4

	Course Outcome
DJ19ICC406.1	Develop applications by applying SOLID principles as well as appropriate Object- Oriented concepts and APIs.
DJ19ICC406.2	Debug a given code, rectify the errors to get the desired output.
DJ19ICC406.3	Make suitable modifications to programs as per user requirements for solving real world problems.
DJ19ICC406.4	Develop GUI applications using modern APIs (JAVAFX, swings, etc.)
DJ19ICC406.5	Work effectively as a member of a team.

Course: Environmental Studies Course Code: DJ19A5
Year/Semester: SE/IV Course Credits: 4

	Course Outcome
DJ19A5.1	Understand how human activities affect environment.
DJ19A5.2	Understand the various technology options that can make a difference
DJ19A5.3	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.

SHRI VILEPARLE KELAVANI MANDAL'S
DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING
(Autonomous College Affiliated to the University of Mumbai)
NAAC ACCREDITED with "A" GRADE (CGPA : 3.18)

Department of Chemical Engineering
COURSE OUTCOME STATEMENTS

SEM V

DJ19CHC501 and DJ19CHL501 Chemical Reaction Engineering-I and Lab and Tutorial	
Course outcome	CO statement
After completing the course , student will be able to:	
DJ19CHC501.1	Identify and analyze different types of homogeneous reactions.
DJ19CHC501.2	Apply the knowledge they have gained to develop kinetic models for different types of Homogeneous reactions
DJ19CHC501.3	Find the model equation and use this model to design the reactors used for Homogeneous reactions.
DJ19CHC501.4	Understand the effect of temperature on reactor performance for adiabatic and non-adiabatic operation and develop kinetic model to design the reactors for adiabatic and non-isothermal

DJ19CHC502 and DJ19CHL502 Mass Transfer Operation -I **and Lab and Tutorial**	
Course outcome	CO statement
DJ19CHC502.1	Demonstrate the knowledge of mass transfer by applying principles of diffusion, mass transfer coefficients, and interphase mass transfer
DJ19CHC502.2	Understand the concept and operation of various types of gas-liquid contacts equipment
DJ19CHC502.3	Determine NTU, HTU, HETP and height of packed bed used for Absorption and Humidification operations.
DJ19CHC502.4	Find time required for drying and design of drying equipment

DJ19CHC503 and DJ19CHL503 Heat Transfer Operations and Lab and Tutorial	
Course outcome	CO statement
After completing the course , student will be able to:	
DJ19CHC503.1	Analyze steady state conduction, unsteady state heat transfer from solids.
DJ19CHC503.2	Analyze heat transfer by Convection, Radiation, Boiling and Condensation.
DJ19CHC503.3	Design Heat Transfer Equipment such as DPHE, THE.
DJ19CHC503.4	Understand Design aspects of Condensers, Evaporators, Agitated Vessels.

Department of Chemical Engineering

DJ19CHC504 and DJ19CHL504 Chemical Process Safety and Utilities and Tutorial	
Course outcome	CO statement
DJ19CHC504.1	Know the safety hazards in a process industry
DJ19CHC504.2	Design ventilation systems for process area
DJ19CHC504.3	Analyze HAZOP of any node in a piping and instrumentation
DJ19CHC504.4	diagram To know the utilities in Chemical Plants

Operations Research in Chemical Engineering DJ19CHEC5011	
Course outcome	CO statement
After completing the course , student will be able to:	
DJ19CHEC5011.1	To understand Linear Programming and its applications to OR models.
DJ19CHEC5011.2	To understand and solve network models in OR.
DJ19CHEC5011.3	To understand Game theory and its applications.
DJ19CHEC5011.4	To understand and solve Scheduling Problems as Queuing systems

Biotechnology DJ19CHEC6011	
Course outcome	CO statement
After completing the course , student will be able to:	
DJ19CHEC6011.1	Understand cell and metabolism.
DJ19CHEC6011.2	Understand the concept of genetic engineering
DJ19CHEC6011.3	Understand Enzymes in detail and their kinetics. Understand the design of bio reactors
DJ19CHEC6011.4	Understand applications of biotechnology in medical/pharmaceutical field, in agricultural, food and beverage industry, chemical industries, environment, and energy sectors.

Sustainable Technologies DJ19CHEC5013	
Course outcome	CO statement
After completing the course , student will be able to:	
DJ19CHEC5013.1	Understand the economic, technical, and societal issues involved in sustainable manufacturing.
DJ19CHEC5013.2	Understand the various technology options that can make a difference.
DJ19CHEC5013.3	To apply environment friendly choices of materials and processes' selection.
DJ19CHEC5013.4	To develop design for environment.

Department of Chemical Engineering

Advanced Material Science DJ19CHEC5014	
Course outcome	CO statement
After completing the course , student will be able to:	
DJ19CHEC5014.1	Identify various types of advanced materials such as polymers, ceramics and composites. .
DJ19CHEC5014.2	Understand the properties of various advanced polymeric, ceramic and metallic materials and their applications in various fields.
DJ19CHEC5014.3	Understand the fabrication of various composite materials.
DJ19CHEC5014.4	Understand the different thin film coating methods and their applications in various fields

Professional and Business Communication Laboratory DCHL505	
Course outcome	CO statement
After completing the course , student will be able to:	
DCHL505.1	Plan, organize and write technical documents like reports, proposals and research papers in the prescribed format using appropriate language and style with an understanding of ethics in written communication
DCHL505.2	Apply techniques of writing resume, participating in a group discussion and facing interviews
DCHL505.3	Develop interpersonal skills in professional and personal situations Understand the documentation process of meetings and conduct meetings in a professional manner
DCHL505.4	Understand communication across cultures and work ethics.

Innovative Product Development DJ19ILL1	
Course outcome	CO statement
After completing the course , student will be able to:	
DJ19ILL1.1	Identify the requirement for a product based on societal/research needs. Apply knowledge and skills required to solve a societal need by conceptualising a product, especially while working in a team.
DJ19ILL1.2	Use standard norms of engineering concepts/practices in the design and development of an innovative product. Draw proper inferences through theoretical/ experimental/simulations and analyse the impact of the proposed method of design and development of the product.

Department of Chemical Engineering

DJ19ILL1.3	Develop interpersonal skills, while working as a member of the team or as the leader. Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, which could eventually prepare themselves to be successful entrepreneurs.
DJ19ILL1.4	Demonstrate product/project management principles during the design and development work and also excel in written (Technical paper preparation) as well as oral communication.

Department of Chemical Engineering

SEM VII

DJ19CHC701 Process Dynamics and Control Laboratory & Tutorial	
Course outcome	CO statement
After completing the course , student will be able to:	
DJ19CHC701.1	The student will be able to model dynamical systems
DJ19CHC701.2	Will be able to study their responses in Time, Laplace and Frequency domains.
DJ19CHC701.3	The student will be able to design stable controllers, for important chemical processes
DJ19CHC701.4	The student will be able to design stable controllers, for important chemical processes

DJ19CHC702 Process Engineering and Tutorial	
Course outcome	CO statement
After completing the course , student will be able to:	
DJ19CHC702.1	The student should be able to select the relevant Chemical Process for the economic and technological condition of the country
DJ19CHC702.2	The student should be able to evolve a Process Flow diagram for a chemical process by doing a research on the pathways to the selected compound.
DJ19CHC702.3	The student should be able to size the chemical equipment after solve the process flow sheet for mass and energy.
DJ19CHC702.4	The student should be aware of Process Simulator

DJ19CHEC7011 Nanotechnology	
Course outcome	CO statement
After completing the course , student will be able to:	
Understand	Understand the essential concepts used in nanotechnology
Analyze	Gain knowledge of fabrication and characterization methods in nanotechnology.
- Apply	Gain knowledge of structure, properties, applications, and preparation techniques of nano-scale materials like Fullerenes and Carbon Nano Tubes.
Analyze	Gain knowledge about importance and applications of nanotechnology in the field of biology, medicines.

Department of Chemical Engineering

	Heterogeneous Catalysis
Course outcome	CO statement
After completing the course , student will be able to:	
DJ19CHEC7012.1	To apply the knowledge they have gained to find the model equation
DJ19CHEC7012.2	To apply the knowledge they have gained to use this model to design the reactors used for heterogeneous reactions
DJ19CHEC7012.3	To apply the knowledge they have gained to taking place in isothermal or non-isothermal conditions.
DJ19CHEC7012.4	To apply the knowledge they have gained to taking place in isothermal or non-isothermal conditions.

DJ19CHEC7013 High Performance Leadership	
Course outcome	CO statement
After completing the course , student will be able to:	
DJ19CHEC7013.1	Improve one's self leadership skills through effective emotion regulation and emotional intelligence.
DJ19CHEC7013.2	Apply concepts of leadership and effective communication to individuals, groups, and organizations

DJ19CHEC7014 **Food Technology**	
Course outcome	CO statement
After completing the course , student will be able to:	
DJ19CHEC7014.1	Understand knowledge of food essential nutrients and the various causes of food deterioration
DJ19CHEC7014.2	Identification of appropriate processing, preservation, and packaging method.
DJ19CHEC7014.3	Students should be able to analyze product quality and effect of processing technique on it.
DJ19CHEC7014.4	Analysis of food related hazards and HACCP method

DJ19CHS701 Seminar	
Course outcome	CO statement
After completing the course , student will be able to:	
DJ19CHS701.1	Seminar topics will be the consensus of the project guide and the students. Each student will work on a unique topic.
DJ19CHS701.2	Seminar topics will be the consensus of the project guide and the students. Each student will work on a unique topic.

DJ19CHS701.3	Seminar topics will be the consensus of the project guide and the students. Each student will work on a unique topic.
DJ19CHS701.4	Seminar topics will be the consensus of the project guide and the students. Each student will work on a unique topic.

DJ19CHP701 Project-A	
Course outcome	CO statement
After completing the course , student will be able to:	
DJ19CHP701.1	Students should spend considerable time in applying all the concepts studied, into the project. Hence, six hours each are allotted in Project to the students
DJ19CHP701.2	Students should spend considerable time in applying all the concepts studied, into the project. Hence, six hours each are allotted in Project to the students
DJ19CHP701.3	Students are advised to take up industrial/ experimental oriented/ simulation and/or optimization based topics for their projects.
DJ19CHP701.4	Students are advised to take up industrial/ experimental oriented/ simulation and/or optimization based topics for their projects.

Department of Electronics Engineering

Semester: V

Course Outcomes

DJ19ELXC501 & DJ19ELXL501 Power Electronics & Power Electronics Laboratory

Learner should be able to :	
DJ19ELXC501.1	Differentiate and Design lower power & higher power applications & their control elements.
DJ19ELXC501.2	Compute, Design and Analyse Triggering, Commutation and Protection Mechanisms for power devices.
DJ19ELXC501.3	Compute & Analyse performance parameters for controlled rectifiers, inverters & voltage controllers.
DJ19ELXC501.4	Simulate and Design various applications in daily usage – SMPS, UPS, Induction Heating, Speed & Illumination Control.

DJ19ELXC502 & DJ19ELXL502 - Design with Linear Integrated Circuits & Design with Linear Integrated Circuits Laboratory

Learner should be able to :	
DJ19ELXC502.1	Demonstrate an understanding of fundamentals of integrated circuits.
DJ19ELXC502.2	Analyze the various applications and circuits based on particular linear integrated circuit.
DJ19ELXC502.3	Select and use an appropriate integrated circuit to build a given application.
DJ19ELXC502.4	Design an application with the use of integrated circuit

DJ19ELXC503 & DJ19ELXL503 - Microprocessors and Microcontrollers & Microprocessors and Microcontrollers Laboratory

Learner should be able to :	
DJ19ELXC503.1	Understand and explain AVR microcontroller architecture.
DJ19ELXC503.2	Develop assembly language programs for AVR microcontroller.
DJ19ELXC503.3	Design and implement AVR microcontroller-based systems.
DJ19ELXC503.4	Understand and explain 16-bit and 32-bit microprocessor architecture.

Department of Electronics Engineering

DJ19ELEC5011 & DJ19ELXEL5011 - Advanced Control Systems & Advanced Control Systems Laboratory

Learner should be able to :	
DJ19ELEC5011.1	Analyze the system behavior based on the mathematical model of that system where the model may be expressed in state-space domain.
DJ19ELEC5011.2	Justify the need for digital control systems as well as understand sampling and reconstruction of analog signals.
DJ19ELEC5011.3	Model the digital systems using various discretization methods and understand the concept of Pulse Transfer Function.
DJ19ELEC5011.4	Analyze the digital control systems using classical techniques.
DJ19ELEC5011.5	Identify controllers and compensators in different controllers

DJ19ELEC5012 & DJ19ELXEL5012 - Data Structures and Algorithms & Data Structures and Algorithms Laboratory

Learner should be able to :	
DJ19ELEC5012.1	Define basic linear and non-linear data structures and relevant standard algorithms for them.
DJ19ELEC5012.2	Implement operations like searching, insertion, deletion, traversal, etc. on various data structures.
DJ19ELEC5012.3	Apply suitable (efficient) sorting algorithm and implement it.
DJ19ELEC5012.4	Choose appropriate (efficient) searching algorithm for given problem and implement it.
DJ19ELEC5012.5	Choose appropriate (efficient) data structure and algorithm, and apply them to solve specified problems .
DJ19ELEC5012.6	Analyze and evaluate the efficiency of algorithms and data structures based on time and space

Department of Electronics Engineering

DJ19ELEC5013 & DJ19ELXEL5013 - Antennas and Wave Propagation & Antennas and Wave Propagation Laboratory

Learner should be able to :	
DJ19ELEC5013.1	Analyze the behavior of electromagnetic waves in different media.
DJ19ELEC5013.2	Evaluate various parameters of transmission lines and radiating systems.
DJ19ELEC5013.3	Apply computational techniques (FEM, FDM, MOM) to analyze electromagnetic field distribution.
DJ19ELEC5013.4	Understand different antenna parameters.
DJ19ELEC5013.5	Understand different types of linear wire antenna and antenna arrays

DJ19ELXSBL1 - Skill based Course – I Laboratory

Learner should be able to :	
DJ19ELXSBL1.1	Demonstrate use of open source PCB design tool – Kicad, for designing single and double sided PCBs
DJ19ELXSBL1.2	Fabricate and test at-least two circuits.
DJ19ELXSBL1.3	Demonstrate working of IoT ready DIY board for providing task-based solutions.

DJ19IHL2 - Professional and Business Communication Laboratory

Learner should be able to :	
DJ19IHL2.1	Plan, organize and write technical documents like reports, proposals and research papers in the prescribed format using appropriate language and style with an understanding of ethics in written communication.
DJ19IHL2.2	Apply techniques of writing resume, participating in a group discussion and facing interviews.
DJ19IHL2.3	Develop interpersonal skills in professional and personal situations.
DJ19IHL2.4	Understand the documentation process of meetings and conduct meetings in a professional manner.
DJ19IHL2.5	Understand communication across cultures and work ethics.

DJ19IHL2.6	Design and deliver effective presentations using Power Point

DJ19ILL1 - Innovative Product Development - III

Learner should be able to :	
DJ19ILL1.1	Identify the requirement for a product based on societal/research needs.
DJ19ILL1.2	Apply knowledge and skills required to solve a societal need by conceptualizing a product, especially while working in a team.
DJ19ILL1.3	Use standard norms of engineering concepts/practices in the design and development of an innovative product.
DJ19ILL1.4	Draw proper inferences through theoretical/ experimental/simulations and analyze the impact of the proposed method of design and development of the product.
DJ19ILL1.5	Develop interpersonal skills, while working as a member of the team or as the leader.
DJ19ILL1.6	Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, which could eventually prepare themselves to be successful entrepreneurs.
DJ19ILL1.7	Demonstrate product/project management principles during the design and development work and also excel in written (Technical paper preparation) as well as oral communication.

Semester: VI

DJ19ELXC601 & DJ19ELXL601- Embedded Systems & RTOS & Embedded Systems & RTOS Laboratory

Learner should be able to :	
DJ19ELXC601 .1	Identify and describe various characteristic features and applications of embedded systems.
DJ19ELXC601 .2	Analyze and identify hardware for embedded system implementations.
DJ19ELXC601 .3	Analyze and identify various software issues involved in embedded systems for real time requirements. implementation.
DJ19ELXC601 .4	Analyze and explain the design life-cycle for embedded system

Department of Electronics Engineering

DJ19ELXC602 & DJ19ELXL602- Digital Signal Processing & Digital Signal Processing Laboratory

Learner should be able to :	
DJ19ELXC602.1	Understand the discrete time signals and system behavior of LSI/LTI system in time domain.
DJ19ELXC602.2	Understand the concept of digital frequency, effect of aliasing due to improper sampling.
DJ19ELXC602.3	Understand linear and circular convolution analytical and graphical methods
DJ19ELXC602.4	Demonstrate knowledge of various frequency spectrum using DTFS, DTFT DFT/FFT.
DJ19ELXC602.5	Design IIR (Infinite impulse response) filter using Z – Transform and its realization using canonic structure, cascade and parallel form.
DJ19ELXC602.6	Design FIR (Finite impulse response) filter using windowing and frequency sampling method.

DJ19ELXC603 & DJ19ELXL603: VLSI Design & VLSI Design Laboratory

Learner should be able to :	
DJ19ELXC603.1	Demonstrate a clear understanding of choice of technology, scaling and system level design issues.
DJ19ELXC603.2	Analyze MOS based inverters.
DJ19ELXC603.3	Design MOS based circuits with different design styles.
DJ19ELXC603.4	Design semiconductor memories, adders and multipliers.

DJ19ELEC6021 & DJ19ELEL6021 - Advanced Power Electronics & Advanced Power Electronics Laboratory

Learner should be able to :	
DJ19ELEC6021.1	Understand and implement modern methods of analysis and control of power electronic systems.
DJ19ELEC6021.2	Carry out the theoretical analysis of the power electronic systems from the 'Systems Theory' point of view.
DJ19ELEC6021.3	Appreciate the ubiquity of power electronic systems in engineering fields.

DJ19ELEC6021.4	Simulate and analyse power electronic systems.

DJ19ELEC6022 & DJ19ELEL6022-Operating Systems & Operating Systems Laboratory

Learner should be able to :	
DJ19ELEC6022.1	Analyze and evaluate the performance of different process and disk scheduling algorithms.
DJ19ELEC6022.2	Demonstrate inter-process communication and process synchronization.
DJ19ELEC6022.3	Analyze and evaluate various deadlock detection, avoidance and removal techniques.
DJ19ELEC6022.4	Analyze and evaluate memory management policies in different scenarios.
DJ19ELEC6022.5	Evaluate different file organization and access techniques

DJ19ELEC6023 & DJ19ELEL6023 Mobile Communication & Mobile Communication Laboratory

Learner should be able to :	
DJ19ELEC6023.1	Analyse the concepts of basic cellular system, frequency reuse, channel assignment.
DJ19ELEC6023.2	Analyse the fundamentals of radio propagation, Path loss and comprehend the effect of Fading.
DJ19ELEC6023.3	Compare the different multiple access technologies and different spread spectrum techniques.
DJ19ELEC6023.4	Acquire the knowledge about overall GSM cellular concept and analyze its services and features.
DJ19ELEC6023.5	Comprehend the features of CDMA technology.
J19ELEC6023.6	Analyse the evolution of cellular technology from 2G to 4G cellular systems.

Department of Electronics Engineering

DJ19ELXSBL2 -Skill Based Course – II Laboratory

Learner should be able to :	
DJ19ELXSBL2.1	Design and deploy web pages/sites for a predefined functional definition.
DJ19ELXSBL2.2	Design and deploy applications in Android platform for a specified application.

DJ19ILL2 - Innovative Product Development – IV

Learner should be able to :	
DJ19ILL2.1	Identify the requirement for a product based on societal/research needs.
DJ19ILL2.2	Apply knowledge and skills required to solve a societal need by conceptualizing a product, especially while working in a team.
DJ19ILL2.3	Use standard norms of engineering concepts/practices in the design and development of an innovative product.
DJ19ILL2.4	Draw proper inferences through theoretical/ experimental/simulations and analyze the impact of the proposed method of design and development of the product.
DJ19ILL2.5	Develop interpersonal skills, while working as a member of the team or as the leader.
DJ19ILL2.6	Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, which could eventually prepare them to be successful entrepreneurs.
DJ19ILL2.7	Demonstrate product/project management principles during the design and development work and also excel in written (Technical paper preparation) as well as oral communication.

DJ19A3-Environmental Studies

Learner should be able to :	
DJ19A3.1	Understand how human activities affect environment
DJ19A3.2	Understand the various technology options that can make a difference

Department of Electronics Engineering

Semester: VII

DJ19ELXC701 & DJ19ELXL701-Artificial Intelligence and Machine Learning & Artificial Intelligence and Machine Learning Laboratory

Learner should be able to :	
DJ19ELXC701.1	Develop a basic understanding of AI building blocks presented in intelligent agents.
DJ19ELXC701.2	Design appropriate problem solving method for an agent to find a sequence of actions to reach goal state.
DJ19ELXC701.3	Analyze various AI approaches to knowledge intensive problem solving, reasoning and planning.
DJ19ELXC701.4	Gain knowledge about basic concepts of Machine Learning 5. Solve the problems using various machine learning techniques

DJ19ELXC702 & DJ19ELXL702- IoT Enterprise Network & IoT Enterprise Network Laboratory

Learner should be able to :	
DJ19ELXC702.1	Outline application & link layer services for wired and wireless applications
DJ19ELXC702.2	Design & optimize – sensors, power modules and actuation for constrained environment applications
DJ19ELXC702.3	Comprehend and evaluate the mechanism needed for network security of application environment
DJ19ELXC702.4	Demonstrate the use of SaaS, PaaS and IaaS services

DJ19ELEC7031 & DJ19ELEL7031-Advanced Digital Signal Processing & Advanced Digital Signal Processing Laboratory

Learner should be able to :	
DJ19ELEC7031.1	Analyze the effect of hardware limitations on performance of digital filters.
DJ19ELEC7031.2	Implement multistage sampling rate conversion.
DJ19ELEC7031.3	Analyze linear prediction methods and optimum linear filters

DJ19ELEC7031.4	Implement adaptive filters for given applications.
DJ19ELEC7031.5	Analyze wavelet theory for various applications

DJ19ELEC7032 & DJ19ELEC7032-Cloud Computing & Cloud Computing Laboratory

Learner should be able to :	
DJ19ELEC7032.1	Implement Virtualization using different types of hypervisors.
DJ19ELEC7032.2	Provide the appropriate cloud computing solutions.
DJ19ELEC7032.3	Design & develop backup strategies for cloud data.

DJ19ELEC7033 & DJ19ELEL7033-Satellite and Optical Fiber Communication & Satellite and Optical Fiber Communication Laboratory

Learner should be able to :

DJ19ELEC7033.1	Differentiate satellite orbits and orbital parameters.
DJ19ELEC7033.2	Describe different satellite sub-systems operation and earth station technology.
DJ19ELEC7033.3	Elaborate various applications of satellite communications.
DJ19ELEC7033.4	Describe the fundamentals and transmission characteristics of optical fiber Communication.
DJ19ELEC7033.5	Analyze various optical sources, detectors and fiber optic components.
DJ19ELEC7033.6	Analyze the optical link budget.

DELXP704-Project - I

Learner should be able to :	
DELXP704.1	Do literature survey/industrial visit and identify the problem
DELXP704.2	Apply basic engineering fundamental in the domain of practical applications.
DELXP704.3	Cultivate the habit of working in a team
DELXP704.4	Attempt a problem solution in a right approach
DELXP704.5	Correlate the theoretical and experimental/simulations results and draw the proper inferences.

DELXP704.6	Prepare report as per the standard guidelines

Semester: VIII

DJ19ELXC801 & DJ19ELXL801-Robotics and Industrial Automation & Robotics and Industrial Automation Laboratory

Learner should be able to :	
DJ19ELXC801.1	To understand various robot parameters and its applications.
DJ19ELXC801.2	To apply knowledge of D-H algorithms for robot model representation
DJ19ELXC801.3	To analyze kinematics of robots.
DJ19ELXC801.4	Distinguish different path and trajectory.
DJ19ELXC801.5	Analyze the controller parameters for discrete or continuous type
DJ19ELXC801.6	Design the process controller (electronic) for a given process or application

DJ19ELXC802 & DJ19ELXL802- Digital Image Processing & Digital Image Processing Laboratory

Learner should be able to :	
DJ19ELXC802.1	Illustrate & make use of the fundamental concepts and basic elements of digital image processing.
DJ19ELXC802.2	Apply image enhancement in spatial domain, frequency domain and using histogram modeling.
DJ19ELXC802.3	Apply different image segmentation and representation techniques on images.
DJ19ELXC802.4	Examine different morphological operations used in binary image processing.
DJ19ELXC802.5	Analyze image in frequency domain through different transforms.
DJ19ELXC802.6	Analyze different image compression techniques

Department of Electronics Engineering

DJ19ELEC8041 & DJ19ELEL8041-IC and Bio-MEMS Technology & IC and Bio-MEMS Technology Laboratory

Learner should be able to :	
DJ19ELEC8041.1	Demonstrate a clear understanding of various MOS fabrication processes & CMOS fabrication flow.
DJ19ELEC8041.2	Develop or modify the MEMS processes for a simple MEMS device in order to reduce the fabrication time.
DJ19ELEC8041.3	Analyze micro total analysis system with designing of its components
DJ19ELEC8041.4	Demonstrate working principles of different types of Bio Nano-sensors and drug delivery devices along with their fabrication process.

DJ19ELEC8042 & DJ19ELEL8042-Big Data Analytics & Big Data Analytics Laboratory

Learner should be able to :	
DJ19ELEC8042.1	Understand the key issues in big data management.
DJ19ELEC8042.2	Acquire fundamental enabling techniques using tools in big data analytics.
DJ19ELEC8042.3	Achieve adequate perspectives of big data analytics in various applications like sensor, recommender systems, social media applications etc.

DJ19ELEC8043 & DJ19ELEC8043-Advanced Networking Technologies & Advanced Networking Technologies Laboratory

Learner should be able to :	
DJ19ELEC8043.1	Evaluate/ Design Small – Medium Scale Networks from access layer to backbone layer
DJ19ELEC8043.2	Design for Emerging areas such as Iot and IIoT
DJ19ELEC8043.3	Migrate designs to new technologies that are high speed-high security-high QoS Networks

Department of Electronics Engineering

DJ19ILO8021-Project Management

Learner should be able to :	
DJ19ILO8021.1	Explain project management life cycle and the various project phases as well as the role of project manager.
DJ19ILO8021.2	Apply selection criteria and select an appropriate project from different options.
DJ19ILO8021.3	Create a work break down structure for a project and develop a schedule based on it. Manage project risk strategically.
DJ19ILO8021.4	Use Earned value technique and determine & predict status of the project.
DJ19ILO8021.5	Capture lessons learned during project phases and document them for future reference.

DJ19ILO8022-Entrepreneurship Development and Management

Learner should be able to :	
DJ19ILO8022.1	Develop idea generation, creative and innovative skills
DJ19ILO8022.2	Prepare a Business Plan
DJ19ILO8022.3	Compare different entrepreneur supporting institutions
DJ19ILO8022.4	Correlate suitable MSME scheme for an entrepreneur
DJ19ILO8022.5	Interpret financial and legal aspect of a business

DJ19ILO8025-Corporate Finance Management

Learner should be able to :	
DJ19ILO8025.1	Understand Indian finance system.
DJ19ILO8025.2	Apply concepts of time value money and risk returns to product, services and business.
DJ19ILO8025.3	Understand corporate finance; evaluate and compare performance of multiple firms.
DJ19ILO8025.4	Take Investment, finance as well as dividend decisions

Department of Electronics Engineering

DJ19ILO8029-Environmental Management

Learner should be able to :	
DJ19ILO8029.1	Identify Environmental issues and get familiarized to the concept of Ecosystem and environmental management.
DJ19ILO8029.2	Know policies and legal aspects and understand EM system standards.
DJ19ILO8029.3	Understand Environment Impact assessment.
DJ19ILO8029.4	Understand Environment Auditing procedures.
DJ19ILO8029.5	Describe Environmental management Techniques

DELXP804-Project - II

Learner should be able to :	
DELXP804.1	Do literature survey/industrial visit and identify the problem
DELXP804.2	Apply basic engineering fundamental in the domain of practical applications.
DELXP804.3	Cultivate the habit of working in a team.
DELXP804.4	Attempt a problem solution in a right approach.
DELXP804.5	Correlate the theoretical and experimental/simulations results and draw the proper inferences.
DELXP804.6	Prepare report as per the standard guidelines.

Department of Biomedical Engineering

B. Tech. Sem VII: Course Outcomes

DJ19BMC701 Nuclear Medicine

Learners will be able to:	
DJ19BMC701.1	Describe essential physics of nuclear medicine such as basic concepts ofradioactivity, its measurement, interaction with matter and radionuclide production.
DJ19BMC701.2	Explain concepts of radiopharmaceuticals and various aspects of radiation safety.
DJ19BMC701.3	Compare various detectors and counting systems.
DJ19BMC701.4	Describe in-vivo and in-vitro techniques and its applications.
DJ19BMC701.5	Compare various Emission Tomography Techniques along with their ClinicalApplications.

DJ19BMC702 / DJ19BML702 Medical Imaging

Learners will be able to:	
DJ19BMC702.1	Describe use of ultrasound in medicine, distinguish various ultrasonic display systems with appropriate applications and explain the clinical applications.
DJ19BMC702.2	Apply the NMR principles in understanding the MRI working, describe the MRIcomponents, safety considerations and explain clinical applications.
DJ19BMC702.3	Describe basic principle of magnetic resonance spectroscopy and its applications.
DJ19BMC702.4	Describe working of Hybrid imaging and its clinical applications.

DJ19BML703 Product Design Lab

Learners will be able to:	
DJ19BMC703.1	Understand Embedded systems and their design necessary for biomedical applications
DJ19BMC703.2	Understand hardware design/architecture for product design
DJ19BMC703.3	Understand software design/architecture for product design
DJ19BMC703.4	Understand testing and debugging approaches
DJ19BMC703.5	Understand Intellectual Property (IP), product standards and product certificationprocess

Department of Biomedical Engineering

DJ19BMEC7011/DJ19BMEL7011 Deep Learning

Learners will be able to:	
DJ19BMEC7011.1	Design and implement neural network
DJ19BMEC7011.2	Apply and compare various optimization techniques for training deep model
DJ19BMEC7011.3	Design and implement convolution neural network
DJ19BMEC7011.4	Design and implement recurrent neural network
DJ19BMEC7011.5	Apply GAN in healthcare applications

DJ19BMP704 Project Stage - I

Learners will be able to:	
DJ19BMP704.1	Review literature to define problem statement
DJ19BMP704.2	Apply knowledge of the engineering fundamentals acquired during the curriculum and beyond
DJ19BMP704.3	Develop and create design using appropriate design methodologies considering the various health, society and environmental needs.
DJ19BMP704.4	Write problem statement, Design concept in prescribed format.
DJ19BMP704.5	Learn the behavioural science by working in a group.

Department of Biomedical Engineering

B. Tech Sem VIII: Course Outcomes

DJ19BMC801 /DJ19BML801 Biomedical Microsystems

Learners will be able to:	
DJ19BMC801.1	Understand basic properties of MEMS materials and select appropriate material for MEMS application
DJ19BMC801.2	Develop or modify the MEMS processes for a simple MEMS device in order to reducethe fabrication time.
DJ19BMC801.3	Understand different microfabrication techniques and choose appropriate technique
DJ19BMC801.4	Analyze Micro total analysis system with designing of its components
DJ19BMC801.5	Demonstrate working principles of Bio Nano-sensors and drug delivery devices withtypes and fabrication

DJ19BMC802 / DJ19BML802 Hospital Management

Learners will be able to:	
DJ19BMC802.1	Apply the concepts of management (personnel, finance, and material resources) and theprocesses and strategies needed in specific hospital sectors.
DJ19BMC802.2	Apply the knowledge of the management structure and functions in hospital. Communicate effectively and develop their leadership and team building abilities.
DJ19BMC802.3	Apply the principles of designing, implementing and commissioning of clinical services and supportive departments in the hospital.
DJ19BMC802.4	Apply the knowledge and execute the role and take up the responsibilities of BiomedicalEngineer in hospital.
DJ19BMC802.5	Apply the knowledge of functions of Engineering services and axillary services and co-ordinate with them.
DJ19BMC802.6	Apply the knowledge of materials management in hospitals and industry.

DJ19BMEC8011 / DJ19BMEL8011

Big Data and Could computing

Learners will be able to:	
DJ19BMEC8011.1	Understand the key issues in big data management and its associated applications for business decisions and strategy.
DJ19BMEC8011.2	Understand and Develop problem solving and critical thinking skills in fundamentalenabling techniques like Hadoop and NoSQL in big data analytics.
DJ19BMEC8011.3	Evaluate Big Data processing by using MapReduce
DJ19BMEC8011.4	Solve complex real world problems in various applications like recommendersystems, social media applications, health and medical systems, etc.

Department of Biomedical Engineering

DJ19BMP803 Project Stage - II

Learners will be able to:	
DJ19BMP803.1	Implement the concept of Project Stage-I
DJ19BMP803.2	Use advanced tools for Implementation
DJ19BMP803.3	Rectify/ Debug the design and Submit project report

PRODUCTION ENGINEERING DEPARTMENT

B.E. Semester VII: Course Outcomes

DJ19PEC701 - Industrial Training and Project

Learner will be able to	
DJ19PEC701.1	Get familiarized with various technological trends, approaches and applications along with managerial exposure.
DJ19PEC701.2	Appreciate and realize the size and scale of operations in Industry.
DJ19PEC701.3	Apply the knowledge in problem solving.
DJ19PEC701.4	Demonstrate an understanding of various constraints in industry.
DJ19PEC701.5	Demonstrate the scope, functions and job responsibilities in various departments of an organization.
DJ19PEC701.6	Develop a positive attitude while dealing in professional manner.

B.E. Semester VIII: Course Outcomes

DJ19PEC801- Automation & Control Engineering.

Learner will be able to	
DJ19PEC801.1	Understand the need of automation and apply automation techniques to manufacturing set-ups.
DJ19PEC801.2	Design and develop hydraulic control circuits of medium complexity.
DJ19PEC801.3	Design and develop pneumatic control circuits of medium complexity.
DJ19PEC801.4	Understand the fundamentals of the control system.
DJ19PEC801.5	Understand the application of microprocessors and microcontrollers.

DJ19PEC802 - Computer Aided Engineering.

Learner will be able to	
DJ19PEC802.1	Understand software configuration of graphic packages.
DJ19PEC802.2	Understand use of Computer graphics in design.
DJ19PEC802.3	Identify proper modeling techniques for geometric modelling.
DJ19PEC802.4	Solve physical and engineering problems with emphasis on Structural and Thermal Engineering applications.
DJ19PEC802.5	Understand the concept of Computer Integrated Manufacturing.
DJ19PEC802.6	Understand the concept of automated material handling and its methodologies.

PRODUCTION ENGINEERING DEPARTMENT

DJ19PEC803 - Engineering Economics Finance Costing and Accounting.

Learner will be able to	
DJ19PEC803.1	Correlate various micro and macro-economic variables.
DJ19PEC803.2	Illustrate Economic policies and their implications.
DJ19PEC803.3	Get familiarized with the roles played by various financial institutions/banks.
DJ19PEC803.4	Get exposure to various business strategies.
DJ19PEC803.5	Get familiarized with Accounting and costing practices

DJ19PEDO8011 - Advances in Automobile Engineering

Learner will be able to	
DJ19PEDO8011.1	Understand various systems in an automobile.
DJ19PEDO8011.2	Understand the concept of transmission system and its components.
DJ19PEDO8011.3	Understand the concepts of steering system and its application.
DJ19PEDO8011.4	Understand the concepts of brakes, suspension, wheel and balancing etc.
DJ19PEDO8011.5	Understand the electric system used in automobile.
DJ19PEDO8011.6	Understand principle of operation, construction and applications of various sensors used in modern automobile along with recent trends.

DJ19PEDO8012 - Product Design and Development

Learner will be able to	
DJ19PEDO8012.1	Design and develop products right from the conceptual level.
DJ19PEDO8012.2	Demonstrate concept of computer aided product design approach.
DJ19PEDO8012.3	Illustrate various modern approaches like concurrent engineering, product life cycle management, robust design, rapid prototyping / rapid tooling.
DJ19PEDO8012.4	Analyze products based on ergonomics and aesthetic aspects.

DJ19PEDO8013 - World Class Manufacturing

Learner will be able to	
DJ19PEDO8013.1	Identify the challenges in world-class manufacturing.
DJ19PEDO8013.2	Compare different competitive manufacturing strategies.
DJ19PEDO8013.3	Apply different quality tools to improve product and process design.
DJ19PEDO8013.4	Explain how to enhance employee involvement in manufacturing.
DJ19PEDO8013.5	Determine different methods to monitor performance in WCM

PRODUCTION ENGINEERING DEPARTMENT

DJ19PEDO8014 - Plant Engineering

Learner will be able to	
DJ19PEDO8014.1	Plan & design plant layouts and organization for plant engineering.
DJ19PEDO8014.2	Demonstrate selection and use of material handling systems in plant engineering.
DJ19PEDO8014.3	Demonstrate various operational and safety practices including fire safety.
DJ19PEDO8014.4	Illustrate concepts of pollution, noise and vibration control.
DJ19PEDO8014.5	Apply sustainable approaches and practices.

DJ19PEDO8015 - Energy Audit and Management

Learner will be able to	
DJ19PEDO8015.1	To identify and describe present state of energy security and its importance
DJ19PEDO8015.2	To identify and describe the basic principles and methodologies adopted in energy audit of an utility.
DJ19PEDO8015.3	To describe the energy performance evaluation of some common electrical installations and identify the energy saving opportunities.
DJ19PEDO8015.4	To describe the energy performance evaluation of some common thermal installations and identify the energy saving opportunities.
DJ19PEDO8015.5	To analyze the data collected during performance evaluation and recommend energy saving measures.

DJ19PEDO8016 - Sales and Marketing Management

Learner will be able to	
DJ19PEDO8016.1	Illustrate various selling strategies, pricing strategies and methodology of product positioning.
DJ19PEDO8016.2	Get exposure about customer behavior and their implications in marketing.
DJ19PEDO8016.3	Develop capability to assess, analyze and measure sales and marketing performance.
DJ19PEDO8016.4	Get exposure to promotional policies and importance of advertising.
DJ19PEDO8016.5	Evaluate effectiveness of advertising.

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Course Outcome Statements of F.Y B. Tech SEM I / II

DJS22FEC11 & DJS22FET11 Engineering Mathematics I & Tutorial	
After completing the course, Student will be able to:	
DJS22FEC11.1	Apply principles of basic operations of matrices to find rank and echelon form of matrices to solve system of simultaneous equations.
DJS22FEC11.2	Illustrate the basic concepts of Complex numbers and apply the knowledge of complex numbers to solve problems in hyperbolic functions and logarithmic functions.
DJS22FEC11.3	Illustrate the knowledge of Successive differentiation and Expansion of function.
DJS22FEC11.4	Illustrate the basic principles of Partial differentiation and application to find maxima, minima, error & approximation.
DJS22FEC11.5	Illustrate SciLab programming techniques to the solution of linear, non-linear, and simultaneous algebraic equations.

DJS22FEC12 & DJS22FEL12 Structured Programming using C, Laboratory	
After completing the course, Student will be able to:	
DJS22FEC12.1	Implement the programs in C.
DJS22FEC12.2	Debug the C programs.

DJS22FECEP & DJS22FELEP Engineering Physics, Laboratory & Tutorial	
After completing the course, Student will be able to:	
DJS22FECEP.1	Relate the scope and foundation of quantum mechanics & quantum computing and its role in development of modern technology.
DJS22FECEP.2	Apply the foundations of Optics and Photonics in precision measurements indispensable for the development of modern communication technology.
DJS22FECEP.3	Relate and interpret the basics of Electrodynamics, which are prerequisite in modern developments for signal communications, Antenna Theory etc.
DJS22FECEP.4	Assimilate the wide scope of the essential properties of Superconductors in current and futuristic frontier applications and explore basic sensing techniques for physical measurements in modern instrumentation.

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DJS22FECEM & DJS22FELEM Computational Engineering Mechanics,Laboratory	
After completing the course, Student will be able to:	
DJS22FECEM.1	Illustrate the effect of force and moment and apply the same along with the concept of equilibrium systems with the help of FBD
DJS22FECEM.2	Correlate real life application to specific type of friction and estimate required force to overcome friction
DJS22FECEM.3	Establish relation between velocity and acceleration of a particle and analyze the motion by plotting the relation
DJS22FECEM.4	Understand the concept of geometric transformations of an element/object
DJS22FECEM.5	Analyze general plane motion of rigid bodies
DJS22FECEM.6	Analyze problems on statics and dynamics using software packages.

DJS22FECBE & DJS22FELBE Basic Electrical Engineering & Digital Electronics, Laboratory	
After completing the course, Student will be able to:	
DJS22FECBE.1	Apply the knowledge of theorems/laws to analyse the DC circuits.
DJS22FECBE.2	Analyse single phase AC circuits.
DJS22FECBE.3	Demonstrate knowledge of basic number system, logic gates and sequential circuits.
DJS22FECBE.4	Illustrate the working principle behind the electronic components used to build a drone.

DJS22FECEC & DJS22FELEC Engineering Chemistry, Laboratory & Tutorial	
After completing the course, Student will be able to:	
DJS22FECEC.1	Understand new approaches of analysis, which are more convenient, less hazardous and sustainable to perform.
DJS22FECEC.2	Understand applications based on nanomaterials and modern polymers in engineering techniques
DJS22FECEC.3	Rationalize properties of materials and alloys with phase transformation and analyze the quality of fuel for energy efficiency
DJS22FECEC.4	Suggest suitable methods of water treatment and identify the parameters responsible for water pollution

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DJS22FECEG & DJS22FELEG Engineering Graphics, Laboratory	
Course Outcome	CO Statement
After completing the course, Student will be able to:	
DJS22FECEG.1	Recognize the value of engineering graphics, as a language of engineers
DJS22FECEG.2	Construct orthographic views of lines, and basic shapes of solids
DJS22FECEG.3	Interpret and sketch orthographic and sectional orthographic views of various machine components
DJS22FECEG.4	Visualize objects, and draw isometric views
DJS22FECEG.5	Build 2D sketches using Auto CAD

DJS22FECCS & DJS22FELCS Effective Communication Skills, Laboratory	
After completing the course, Student will be able to:	
DJS22FECCS.1	Use skills related to the various aspects of communication to express ideas with greater clarity
DJS22FECCS.2	Apply appropriate verbal/non-verbal cues in social and workplace situations and overcome the barriers to communication
DJS22FECCS.3	Employ personal development strategies for self- assessment, goal setting and maintaining a professional persona online

DJS22FEWP Workshop Practices	
After completing the course, Student will be able to:	
DJS22FEWP.1	Get oriented to an engineering workshop environment and learn to conduct oneself adhering to the safety norms and set procedures
DJS22FEWP.2	Get familiarized with various methods of commonly used fabrication techniques and the type of hand tools /power tools required to perform such of these techniques
DJS22FEWP.3	Get familiarize with the production of simple jobs like joints, component of simple shape etc. as per component drawings with reasonable degree of tolerance.in fitting, carpentry, sheet metal, plumbing, welding, machining, 3D printing, electrical and electronic trades

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DJS22A1 Indian Knowledge Tradition	
After completing the course, Student will be able to:	
DJS22A1.1	Understand the importance, nature, and scope of Indian Knowledge Tradition.
DJS22A1.2	Know the history of Indian Knowledge System.
DJS22A1.3	Know the basic structure of Indian Knowledge Tradition.
DJS22A1.4	Acquire knowledge about the various systems followed to impart knowledge in ancient and medieval India.
DJS22A1.5	Be aware of Yoga system and its impact on health.

DJS22FECEC21 & DJS22FET21 Engineering Mathematics II & Tutorial	
After completing the course, Student will be able to:	
DJS22FEC21.1	Illustrate the concepts of Beta and Gamma function, DUIS and rectification of plane curves.
DJS22FEC21.2	Apply the concepts of Multiple Integrals.
DJS22FEC21.3	Solve various types of First Order and Higher Order differential equations.
DJS22FEC21.4	Apply the basic concepts of Descriptive Statistics.
DJS22FEC21.5	Apply the principles of Numerical Method for solving differential equation and numerical integration analytically and using SciLab.

DJS22FEC22 & DJS22FEL22 Object Oriented Programming using Java,Laboratory	
After completing the course, Student will be able to:	
DJS22FEC22.1	Develop programs by applying Object-Oriented concepts of JAVA to solve real-world problems
DJS22FEC22.2	Achieve Robustness and Concurrency while developing programs
DJS22FEC22.3	Design Graphical User Interface using swing