



MASTER OF TECHNOLOGY (ET0151)

Program Outcomes
Program Specific Outcomes
Course Outcomes

PROGRAM OUTCOMES OF M. TECH. (POs)

- PO1. Apply knowledge, skills, and current tools, recent computing technologies of Computer Science and Engineering innovatively to different applications
- PO2. Enhance skills to design and conduct experiments, as well as to analyze and interpret data and address the research gaps to produce solutions with the help of tools, technology and products.
- PO3. Enhance critical thinking by acquiring the skills in modern techniques, methodologies and tools to be innovative and creative.
- PO4. Understand the contemporary research, security issues in the different areas of computer science & engineering.
- PO5. An ability to identify, analyze, design, develop, implement and integrate software and hardware based computer systems.
- PO6. An ability to communicate effectively, express /present ideas in an impressive and professional manner, both in written and verbal forms.
- PO7. An ability to understand leadership and entrepreneurship qualities.
- PO8. An ability to work in multidisciplinary and multicultural environment, become entrepreneur.
- PO9. An ability to understand health, ethical, legal, financial, and professional responsibilities.
- PO10. To recognizes the need for self-motivation and ability to engage in lifelong learning through continuing education, research and professional development.

PROGRAM SPECIFIC OUTCOMES (PSOs)

- PSO1: Ability to apply advanced knowledge of science & engineering and design skill with analytical mind set for solving the real problems through research and development for catering the need of industry.
- PSO2: Ability to investigate innovative, sustainable and environmental adaptive solution for the society to meet the desired need using standard engineering practice.
- PSO3: Formulate relevant research problems; conduct experimental and/or analytical study and analyzing results with modern mathematical / scientific methods and use of software tools.
- PSO4: Ability to design Secure Model, Efficient algorithms and Develop Effective code for various engineering solutions.

COMPUTER SCIENCE ENGINEERING

COURSE OUTCOMES

(MTCSCS101) Mathematical Foundation of Computer Science

- CO1: Apply the concepts learned in fundamental courses such as Discrete Mathematics, in a theoretical setting; in particular, the application of proof techniques.
- CO2: To demonstrate abstract models of computing, including deterministic (DFA), non-deterministic (NFA) and their power to recognize the languages.
- CO3: To construct pushdown automata and the equivalent context free grammars.CO4: Study and understand the concept of different types of graphs and their uses.
- CO5: Compute probabilities of interesting events and other vital characteristics, and make appropriate conclusions and forecasts
- CO6: Apply linear algebra concepts in two-dimensional graphics transformations, face morphing, face detection, image transformations (e.g., blurring and edge detection, image perspective removal),

classification of tumors as malignant or benign, integer factorization, error-correcting codes, and secret-sharing.

(MTCSCS102) Advanced Data Structures

- CO 1: Understand the implementation of symbol table using hashing techniques.
- CO 2: Develop and analyze algorithms for red-black trees, B-trees and Splay trees, algorithms for text processing applications.
- CO 3: Apply the algorithms and design techniques to solve problems; analyze the complexities of various problems in different domains.
- CO 4: Study and Solve Problem using Dynamic Programming and Greedy Method Algorithms.
- CO 5: Study and Summarize concept of Lower Bound, NP Hard and NP Complete Problems
- CO 6: Identify suitable data structures and develop algorithms for computational geometry problems.

(MTCSCS103A) MACHINE LEARNING

- CO 1: To solve complicated problems using biological neuron system & calculate equation of terminal network.
- CO 2: Recognize the characteristics of machine learning that make it useful to real-world problems. Characterize machine learning algorithms as supervised, semi-supervised, and unsupervised.
- CO 3: Understand algorithms for learning Bayesian networks. Understand reinforcement learning algorithms.
- CO 4: To design and implement neural network systems.
- CO 5: To describe the relation between real brains and simple artificial neural network models.
- CO 6: To explain and contrast the most common architectures and learning algorithms for Multi-Layer Perceptrons, Radial-Basis Function Networks and Kohonen Self-Organising Maps.

(MTCSCS103B) WIRELESS SENSOR NETWORKS

- CO 1: Understand and demonstrate the principles of Sensor Design, Sensors with its applications
- CO 2: To learn the architecture and placement strategies of Sensors, wireless sensor networks
- CO 3: Select and apply appropriate principles for data collection and aggregation methods for problem solving, routing and congestion algorithms
- CO 4: To design, develop , and carry out performance analysis of sensors on specific applications
- CO 5: To explore and implement solutions to real world problems using sensor devices, enumerating its principles of working
- CO 6: Apply the advance engineering principles for the critical analysis of sensor design

(MTCSCS103C) INTRODUCTION TO INTELLIGENT SYSTEMS

- CO 1: would be able to analyze and compare the relative merits of a variety of AI problem and solving techniques
- CO 2: Formulate problems so that exploratory search can be applied, Able to Demonstrate knowledge of the fundamental principles of intelligent systems.
- CO 3: Implement optimal, heuristic and memory bounded search techniques.
- CO 4: Represent knowledge using formal logic and design algorithms to work in a semi-observable environment using logical reasoning.
- CO 5: Design and develop practical algorithms for solving real-life planning problems.

CO 6: Implement probabilistic reasoning techniques to work in uncertain environments.

(MTCSC104A) DATA SCIENCE

CO 1: Apply knowledge of data science process and its tool kit.

CO 2: Explain how data is collected, managed and stored for data science;

CO 3: Understand the concept of statistics and distribution.

CO 4: Understand the Data visualization, their types and encoding decoding.

CO 5: Understand the key concepts in data science, including their real-world applications and the toolkit used by data scientists

CO 6: Implement data collection and management scripts using Python on Spyder (Anaconda3).

(MTCSCS104B) DISTRIBUTED SYSTEMS

CO 1: Identify the advantages and challenges in designing distributed algorithms for different primitives like mutual exclusion, deadlock detection, agreement, etc.

CO 2: Examine the fundamental principles of distributed systems

CO 3: Design and develop distributed programs using sockets and RPC/RMI.

CO 4: Differentiate between different types of faults and fault handling techniques in order to implement fault tolerant systems.

CO 5: Analyze different algorithms and techniques for the design and development of distributed systems subject to specific design and performance constraints.

CO 6: Able to understand relational database management systems, normalization to make efficient retrieval from database and query.

(MTCSCS104C) COURSE OUTCOMES OF ADVANCED WIRELESS AND MOBILE NETWORKS

CO 1: Demonstrate advanced knowledge of networking and wireless networking

CO 2: Understand various types of wireless networks, standards, operations and use cases.

CO 3: Be able to design WLAN, WPAN, WWAN, Cellular based upon underlying propagation and performance analysis.

CO 4: Demonstrate knowledge of protocols used in wireless networks and

CO 5: Learn simulating wireless networks.

CO 6: Design wireless networks exploring trade-offs between wire line and wireless links. Develop mobile applications to solve some of the real world problems.

(MTCOMRS105) COURSE OUTCOMES OF Research Methodology and IPR

CO1: Understand research problem formulation. Analyze research related information & Follow research ethics.

CO2: Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.

CO3: Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasize the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.

CO4: Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

(MTCSCS107) ADVANCED DATA STRUCTURES LAB

- o Understand the implementation of symbol table using hashing techniques.
- o Develop and analyze algorithms for red-black trees, B-trees and Splay trees, algorithms for text processing applications.
- o Apply the algorithms and design techniques to solve problems; analyze the complexities of various problems in different domains.
- o Study and Solve Problem using Dynamic Programming and Greedy Method Algorithms.
- o Study and Summarize concept of Lower Bound, NP Hard and NP Complete Problems
- o Identify suitable data structures and develop algorithms for computational geometry problems.

(MTCSCS108B) DISTRIBUTED SYSTEMS LAB

- o Identify the advantages and challenges in designing distributed algorithms for different primitives like mutual exclusion, deadlock detection, agreement, etc.
- o Examine the fundamental principles of distributed systems
- o Design and develop distributed programs using sockets and RPC/RMI.
- o Differentiate between different types of faults and fault handling techniques in order to implement fault tolerant systems.
- o Analyze different algorithms and techniques for the design and development of distributed systems subject to specific design and performance constraints.
- o Able to understand relational database management systems, normalization to make efficient retrieval from database and query.

(MTCSCS201) INFORMATION SECURITY SYSTEMS

CO 1: apply knowledge of plaintext, cipher text, RSA and other cryptographic algorithm, Key Distribution to various Network Models

CO 2: Apply Communication Model in Computer Engineering Domain

CO 3: Study Various models for data compression

(MTCSCS202) SOFT COMPUTING

CO 1: Identify and describe soft computing techniques and their roles in building intelligent machines

CO 2: Apply fuzzy logic and reasoning to handle uncertainty and solve various engineering problems.

CO 3: Apply genetic algorithms to combinatorial optimization problems.

CO 4: Evaluate and compare solutions by various soft computing approaches for a given problem.

(MTCSCS203A) DATA PREPARATION AND ANALYSIS

CO 1: Able to extract the data for performing the Analysis.

CO 2: Work with Big Data platforms and explore the techniques

CO 3: Designing the efficient algorithms for mining the data from large volumes.

CO 4: Understand the basics of various big data analytics techniques.

(MTCSCS203B) SECURE SOFTWARE DESIGN & ENTERPRISE COMPUTING

- CO 1: Differentiate between various software vulnerabilities.
- CO 2: Software process vulnerabilities for an organization.
- CO 3: Monitor resources consumption in a software.
- CO 4: Inter-relate security and software development process.

(MTCSCS203C) COMPUTER VISION

- CO 1: Review the fundamental concepts of a digital image processing system and Analyze images in the frequency domain using various transforms.
- CO 2: Evaluate the techniques for Image enhancement used in digital image processing
- CO 3: Developed the practical skills necessary to build computer vision applications.
- CO 4: To have gained exposure to object and scene recognition and categorization from images.

(MTCSCS204A) ADVANCED COMMUNICATION NETWORK

- CO 1: Understand advanced concepts in Communication Networking
- CO 2: Design and develop protocols for Communication Networks.
- CO 3: Understand the mechanisms in Quality of Service in networking.
- CO 4: Optimize the Network Design.

(MTCSCS204B) GPU COMPUTING

- CO 1: Students would learn concepts in parallel programming
- CO 2: Implementation of programs on GPUs,
- CO 3: Debugging of the programs
- CO 4: Profiling parallel programs.

(MTCSCS204C) DIGITAL FORENSICS

- CO 1: Understand relevant legislation and codes of ethics
- CO 2: Computer forensics and digital detective and various processes, policies and procedures
- CO 3: E-discovery, guidelines and standards, E-evidence, tools and environment.
- CO 4: Email and web forensics and network forensics.

(MTCSCS206) INFORMATION SECURITY SYSTEMS LAB

- CO 1 Apply knowledge of plaintext, cipher text, RSA and other cryptographic algorithm, Key Distribution to various Network Models
- CO 2 Apply Communication Model in Computer Engineering Domain
- CO 3 Study Various models for data compression
- CO 4 Apply knowledge of plaintext, cipher text, RSA and other cryptographic algorithm, Key Distribution to various Network Models

(MTCSCS207) ADVANCED COMMUNICATION NETWORK LAB

- CO 1 Understand advanced concepts in Communication Networking
- CO 2 Design and develop protocols for Communication Networks.
- CO 3 Understand the mechanisms in Quality of Service in networking.
- CO 4 Optimize the Network Design.

(MTCSCS301A) MOBILE APPLICATIONS AND SERVICES

- CO 1: Identify the target platform and users and be able to define and sketch a mobile application
- CO 2: Understand the fundamentals, frameworks of mobile Application Platforms
- CO 3: Development lifecycle of mobile application platforms including iOS, Android, and Phone Gap
- CO 4: Design and develop a mobile application prototype in one of the platform (challenge project)

(MTCSCS301B) COMPILER FOR HPC

- CO 1: Familiar with the structure of compiler.
- CO 2: Understand Parallel loops
- CO 3: Identify Data dependency
- CO 4: Exception handling and debugging in compiler.

(MTCSCS301C) OPTIMIZATION TECHNIQUES

- CO 1: Formulate optimization problems.
- CO 2: Understand and apply the concept of optimality criteria for various types of optimization problems.
- CO 3: Solve various constrained and unconstrained problems in Single variable as well as multivariable.
- CO 4: Apply the methods of optimization in real life situation.

(MTCSCS302A) BUSINESS ANALYTICS

- CO 1: Students will demonstrate knowledge of data analytics.
- CO 2: Students will demonstrate the ability of think critically in making decisions based on data and deep analytics.
- CO 3: Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.
- CO 4: Students will demonstrate the ability to translate data into clear, actionable insights.

(MTCSCS302C) OPERATIONS RESEARCH

- CO 1: Students should able to apply the dynamic programming to solve problems of discreet and continuous variables.
- CO 2: Students should able to apply the concept of non-linear programming
- CO 3: Students should able to carry out sensitivity analysis
- CO 4: Student should able to model the real world problem and simulate it.

SANSKRIT FOR TECHNICAL KNOWLEDGE

- CO 1 Understanding basic Sanskrit language
- CO 2 Ancient Sanskrit literature about science & technology can be understood
- CO 3 Being a logical language will help to develop logic in students

VALUE EDUCATION

- CO 1 Knowledge of self-development
- CO 2 Learn the importance of Human values
- CO 3 Developing the overall personality

CONSTITUTION OF INDIA

- CO 1 Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- CO 2 Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
- CO 3 Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
- CO 4 Discuss the passage of the Hindu Code Bill of 1956.

PEDAGOGY STUDIES

- CO1 What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
- CO2 What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
- CO3 How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

STRESS MANAGEMENT BY YOGA

- CO1 Students will be able to: 1. Develop healthy mind in a healthy body thus improving social health also
- CO2 Improve efficiency

PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

- CO1 Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life
- CO2 The person who has studied Geeta will lead the nation and mankind to peace and prosperity
- CO3 Study of Neetishatakam will help in developing versatile personality of students.

MECHANICAL ENGINEERING

COURSE OUTCOME:

MTMEPE101: Computer aided process planning

Course Outcome:

- CO1: Generate the structure of automated process planning system and uses the principle of generative and retrieval CAPP systems for automation
- CO2: Select the manufacturing sequence and explains the reduction of total set up cost for a particular sequence
- CO3: Predict the effect of machining parameters on production rate, cost and surface quality and determines the manufacturing tolerances
- CO4: Explain the generation of tool path and solve optimization models of machining processes
- CO5: Create awareness about the implementation techniques for CAPP

MTMEPE102: Quality Management Systems

Course Outcome:

- CO1 Implement quality concepts in industrial environments and its management.
- CO2 Develop control charts for variables and attributes.
- CO3 Prepare sampling plans using multiple and sequential sampling.
- CO4 Use of Modern tools like implementation-KAIZEN, POKA YOKE, Six sigma etc

MTMEPE103A: Ergonomics and Work System Design

Course Outcome

- CO1 Describe the breadth of how ergonomics is used in today's society.
- CO2 To understand distinguishes between the various standards organizations (i.e. CSA, ANSI, ISO, etc.)
- CO3 Design/development of solutions for Man Machine Systems, Man machine communication, design and arrangements of controls and displays.
- CO4 Apply the knowledge of science, engineering fundamentals
- CO5 To analyze problems of Man machine communication, design and arrangements of controls and displays

MTMEPE103B: Energy Management

Course Outcome

- CO1 Understand the importance of Energy storage for process industries.
- CO2 Learn the techniques of heat recovery systems.

- CO3 Learn the methods of energy management and audits.
- CO4 Able to play a role as an engineer in the society by understanding the economics
- CO5 Problem analysis of Electrical Load and Lighting Management

MTMEPE103C: Machine tool design

Course Outcome

- CO1 Classify the different types of guide ways and power screws.
- CO2 Explain principles and process of Forging, Rolling, Extrusion, drawing and designing of die
- CO3 Analyse the tool life, MRR, Cutting forces and surface finish
- CO4 Apply the knowledge of science in fundamentals of machine tool structures and their requirements and material
- CO5 Understand the modern technique of Dynamics of Machines Tools

MTMEPE104A: Lean Manufacturing

Course Outcomes

- CO1. To understand issues & challenges in implementing & developing lean manufacturing techniques from TPS & its contribution for improving organizational performance.
- CO2. Apply lean techniques to bring competitive business culture for improving organization performance.
- CO3. Analyze how Just In Time Production System techniques can be applied to manufacturing & service industry.
- CO4. To develop lean management strategy for changing customer demand, dealing with the customer, future of lean production.
- CO5. To apply ethical principles by analyzing how lean technique can increase worker morale, foundation for improvements.

MTMEPE104B: Product Engineering

Course Outcome

- CO1 Apply the principles of product design to modify existing engineering systems or to develop new artifacts.
- CO2 Design a system taking into consideration the concepts of ease of production, maintenance, handling, installation etc.
- CO3 Translate the concepts of economics in design, optimization of design and human factors approach to product design.
- CO4 Able to recognize the long life learning experience by Materials Handling, Packaging and Warehouse Functionality

MTMEPE104C: Mechatronics

Course Outcome

- CO1. Select and use appropriate Transducers & Sensors for automated solutions.
- CO2. They should be able to design and implements digital logics using various gates.
- CO3. Program and implement solutions using various Microcontrollers and Microprocessor
- CO4. Program and automated solutions using PLC.
- CO5. Use of modern tool with engineering knowledge in Analog and digital sensors for motion measurement.

MTCOMRS105: Research Methodology and IPR

Course Outcome

- CO1: Understand research problem formulation. Analyze research related information & Follow research ethics.
- CO2: Understand that today's world is controlled by Computer, Modern Mathematical Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
- CO3: Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
- CO4: Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

ERGONOMICS AND WORK SYSTEM DESIGN LAB (MTMEPE107)

COURSE OUTCOMES :

- CO1 Develop a case for productivity improvement in any manufacturing or service industry scenario
- CO2 Independently conduct a method study in any organization with the objective of improving a process, material movement system or design of a work place
- CO3 Develop time standards for operations, identify production bottlenecks and improvise operations
- CO4 Apply principles of good ergonomic design of work areas and equipment

Manufacturing Lab (MTMEPE108)

COURSE OUTCOMES :

- CO1 Develop a case for productivity improvement in any manufacturing or service industry scenario by usm.
- CO2 Independently conduct a method study in any organization with the objective of improving a process, material movement system or design of a work place by ecm
- CO3 Develop time standards for operations, identify production bottlenecks and improvise operations

MTMEPE201: Enterprise Resource Planning

Course Outcome

- CO1 Make basic use of Enterprise software, and its role in integrating business functions
- CO2 Analyze the strategic options for ERP identification and adoption.
- CO3 Design the ERP implementation strategies.
- CO4 Create reengineered business processes for successful ERP implementation.

MTMEPE202: CNC Technology & Programming

Course Outcome

- CO1 Apply the concepts of machining for selection of appropriate machining centers, machining parameters, select appropriate cutting tools for CNC milling and turning equipment, set-up, program, and operate CNC milling and turning equipment.
- CO2 Create and validate NC part program data using manual data input (MDI) for manufacturing of required component using CNC milling or turning applications Through CAM Software's like Fanuc, Siemen's, Unimat etc.
- CO3 Produce an industrial component by interpreting 3D part model/ part drawings using Computer Aided Manufacturing technology through programming, setup, and ensuring safe operation of Computer Numerical Control (CNC) machine tools.
- CO4 Apply the concepts of CNC technology to convert a CNC-lathe into a CNC-Milling machine and vice-versa and also to carry out machining using programmed part programs.
- CO5 Develop prototype models by interpreting 3D part model/ part drawings

MTMEPE203A: Reliability, Maintenance Management & Safety

Course Outcome

- CO 1. Problem solving and decision making (analysis and synthesis, analytical and system thinking, intuition, judgment, result interpretation).
- CO 2. Advanced technical competence (engineering science, modeling, simulation, testing, correlation, validation, result interpretation).
- CO 3. Professional, legal and ethical standards (safety, environmental, quality).
- CO 4. Develop your ability in formulating suitable maintenance strategies to achieve reliable a manufacturing system.
- CO 5. Empower students with the skills to manage a manufacturing system to achieve continuous system availability for production

MTMEPE203B: Cryogenic Systems

Course Outcome

- CO1 To understand and apply the concept of the Mechanical properties; Thermal properties; Electrical and Magnetic properties; properties of Cryogenic fluids in cryogenic process.
- CO2 To study Liquid dual pressure system; Cascaded system; Claude system, Kapitza system, Collins helium liquefaction system etc.
- CO3 To apply latest techniques in cryogenic like Measurement System of Low Temperature: Temperature measurement, Flow rate measurement, Liquid level measurement
- CO4 To design and apply the Effect of heat exchanger; Effectiveness of system performance.
- CO5 To understand practical applicability in Cryogenic Storage & Transfer System: Cryogenic fluid storage vessels, Insulation, Cryogenic transfer system. Vacuum Technology.

MTMEPE203C: Inventory management

Course Outcome

- CO1 Apply the principles of inventory system for cost saving.
- CO2 Design a system taking into consideration the most suitable inventory control model.
- CO3 Apply experimental technique of Modified Control, Distribution Requirement Planning (DRP) in inventory system.
- CO4 Able to recognize the long life learning experience by Requirement of inventory control Systems.

MTMEPE204A: Cellular manufacturing systems

Course Outcome

- CO 1. Understand the effect of manufacturing automation strategies and derive production metrics and Develop manual and APT part programs for 2D complex profiles and test the programs through simulation.
- CO 2. Analyze automated flow lines and assembly systems, and balance the line.
- CO 3. Design automated material handling and storage systems for a typical production system.
- CO 4. Design a manufacturing cell and cellular manufacturing system and Develop VEDO Analysis, Comparison of Different Methods.
- CO 5. Understand the importance of data communications in CIM environment and analyze the role of OSI model in the design of communication protocols.

MTMEPE204B: Concurrent Engineering

Course Outcome

- CO1 Develop computational architecture for concurrent engineering development architecture.
- CO2 Design database for integrated manufacturing and develop knowledge base for product and process.

- CO3 To apply the knowledge and use of Components of PLM
- CO4 To understand the Importance of PLM
- CO5 To understand and apply the knowledge of recent techniques like RP (Rapid prototyping), TD (Total design)

MTMEPE204C: Robotics

Course Outcome

- CO 1. Classify robots based on joints and arm configurations and Design application specific end effectors for robots.
- CO 2. Understand the application of various sensors for direct contact and non-contact. Measurements and Understand many modern devices and technologies used in sensors.
- CO 3. Compute forward and inverse kinematics of robots and determine trajectory plan apply the knowledge in Robot anatomy, end effectors, sensors, vision systems, and kinematics
- CO 4. Program robot to perform typical tasks including Pick and Place, Stacking and Welding.
- CO 5. Design and select robots for Industrial and Non-Industrial applications.

CNC Technology & Programming Lab (MTMEPE206)

Course Outcome

- CO1. Read the given orthographic views; i.e. visualize the 3- Dimensional model of the object shown to its orthographic views and create its CAD model.
- CO2. Describe the various manufacturing processes for material removal and understand the appropriate technology for each of the cutting processes
- CO3. Compare and distinguish the difference between the operation and programming of a CNC machine tool using manual programming and the operation and programming of CNC machine tool using CAM systems.

Robotics Lab (MTMEPE207)

Course Outcome

- CO1 Identify a Robot for a specific application.
- CO2 Interface various Servo and hardware components with Controller based projects.
- CO3 Develop small automatic / autotronics applications with the help of Robotics.
- CO4 Test the robotics circuit.

MTMEPE301A: Automated material handling systems

Course Outcome

- CO1 To understand automated storage, transportation, Lay out of the plant
- CO2 To apply the knowledge of the robots and monorails system in the plant lay out.

- CO3 To design the plant layout as per the current demand by using the latest equipment that is used for the transport and storage.
- CO4 To study the basic principles of material handling and apply them in practical uses.
- CO5 Use of latest technology in the plant layout with the help of knowledge of the robots.

MTMEPE301B: Supply chain practice & procedure

Course Outcome

- CO1. Develop a systematic framework for analyzing the behavior of large and complex supply chain networks.
- CO2. Recognize the relationship and motivations of suppliers and distributors to ensure supplies of raw materials and markets for finished goods.
- CO3. Utilize information technology and various quantitative and qualitative approaches that reduce production, inventory and transportation costs, and improve service levels and profitability.
- CO4. Develop applied research skills which can help you in the analysis of emerging supply chain management issues.
- CO5. Acquire familiarity and a working knowledge of the principles and practice of operations management as applied to the service industries.

MTCOMEL302A: Business Analytics

COURSE OUTCOMES

- CO1: student will get the knowledge about the business and their Analytics Process and relationship.
- CO2: student will be able to design and Analysis the Business Analytics Process and data modeling, sampling.
- CO3: student will get the knowledge about the various Designing Information Policy and Organization Structures of Business, team management.
- CO4: student will develop the different technique and model for business forecasting Techniques and Risk Analysis.
- CO5: student will be able to take the Decision about business marketing data Analysis and Outcome Probabilities.

MTCOMEL302B: Industrial Safety

COURSE OUTCOMES

- CO1: students will be Understand the role of occupational health and safety in the workplace in the prevention of incidents, Injury and illness.
- CO2: students will develop an understanding about the role of plant layout, housekeeping and machine guards to assure health and safety in workplaces.
- CO3: they have knowledge about the different types of effective personal protective gears used in industry for specific operations, their maintenance and disposal methods.

- CO4: students will get the knowledge about Hazard assessment studies and ways to handle hazard situations in industry acting as Environment and Safety officers.
- CO5: students know the structure and function of Disaster management group to handle emergency situations. Understand the economics of safety regarding individual and family, organization and society.

MTCOMEL302C:Operations Research

COURSE OUTCOMES

- CO1: students will get the knowledge the Optimization Techniques and model.
- CO2: they will be analysis the various methods and formula for programming.
- CO3: students will design and program the new problem of project management.
- CO4: students will be get knowledge about the Scheduling and sequencing.
- CO5: students will know the theory of Elementary Graph Theory, Game Theory Simulation.

MTCOMEL302D :Cost Management of Engineering Projects

COURSE OUTCOMES

- CO1: students will be get knowledge and find out the about various cast of engineering project and control their cost.
- CO2: students will get the information various project and their use in engineering work.
- CO3: students will analysis and planning the project and control their cost.
- CO4: students will be able to management the project and their planning.
- CO5: students will design and Programming of various problem and budgets.

MTCOMEL302E:Composite Materials

COURSE OUTCOMES

- CO1: students will get the knowledge different types of materials and their structure.
- CO2: students will design reinforcement and applied matrix.
- CO3: students will get the knowledge material casting and Properties and applications.
- CO4: student will know method and molding of polymer.
- CO5: students will design their Criteria-strength ratio and relation between stress and strain relationship.

MTCOMEL302F:Waste to Energy

COURSE OUTCOMES

- CO1: students will be known about the various types of waste and classification.
- CO2: students will know about the waste energy and how to find the energy from waste.

- CO3:** students will get knowledge about the biomass their manufacture and application.
- CO4:** students will get design and know Operation of all the above biomass combustors.
- CO5:** students will able to design Types of biogas Plants, application and application of biogas sans its treatment plant.

AUDIT COURSES

AUDIT 1 and 2: ENGLISH FOR RESEARCH PAPER WRITING

AUDIT 1 and 2: DISASTER MANAGEMENT

AUDIT 1 and 2: SANSKRIT FOR TECHNICAL KNOWLEDGE

AUDIT 1 and 2: VALUE EDUCATION

AUDIT 1 and 2: CONSTITUTION OF INDIA

AUDIT 1 and 2: PEDAGOGY STUDIES

AUDIT 1 and 2: STRESS MANAGEMENT BY YOGA

AUDIT 1 and 2: PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

ENGLISH FOR RESEARCH PAPER WRITING

- CO1 Understanding basic Sanskrit language
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SANSKRIT FOR TECHNICAL KNOWLEDGE

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VALUE EDUCATION

- CO 1 Knowledge of self-development
- CO 2 Learn the importance of Human values
- CO 3 Developing the overall personality

CONSTITUTION OF INDIA

- CO 1 Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
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CO 4 Discuss the passage of the Hindu Code Bill of 1956.

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- CO2 What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
- CO3 How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

STRESS MANAGEMENT BY YOGA

- CO1 Students will be able to: 1. Develop healthy mind in a healthy body thus improving social health also
- CO2 Improve efficiency

PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

- CO1 Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life
- CO2 The person who has studied Geeta will lead the nation and mankind to peace and prosperity
- CO3 Study of Neetishatakam will help in developing versatile personality of students.

CIVIL ENGINEERING

COURSE OUTCOMES

(MTCETE101) Traffic Engineering-I

COURSE OUTCOMES

- CO1: Students will understand Scope of Traffic Engineering.
- CO2: Study and Analysis of Traffic Engineering.
- CO3: Students will be able to understand the Traffic Signs, Markings and Signals.
- CO4: Students will be able to analyze and design Traffic Engineering Facilities like Channelising Islands, Mini-roundabout, etc.,
- CO5: Evaluation of Regulations on Speed and Traffic management.

(MTCETE102) Highway Materials

COURSE OUTCOMES

- CO1: Understanding aggregates and its Classification.
- CO2: The students will be able to understand the Classification, Structural and Constructional problems in soil.
- CO3: Understanding Bitumen, its sources, manufacturing and its Classification.
- CO4: Student will be able to get knowledge about bituminous mixes.
- CO5: Student will know Cement Concrete, Constituents and their requirements.

(MTCETE103A) Pavement Analysis And Design

COURSE OUTCOMES

- CO1: Students will know the Types and Component parts of Pavements and Subgrade.
- CO2: Analysis of Stresses in Flexible Pavements.
- CO3: Analysis of Stresses in Rigid pavements.
- CO4: Understanding Pavement evaluation and rehabilitation.
- CO5: Students will know various road construction procedures and specifications.

(MTCETE103B) Statistical and Mathematical Techniques

COURSE OUTCOMES

- CO1: Students will analyze the Formulation of the Linear Programming problem.
- CO2: Understanding the Formulation of a transportation problem.
- CO3: Students will be able to understand the Probability Distribution.

CO4: Apply the numerical techniques and tools for the Regression and Correlation.

CO5: Students will know various types of sampling, hypothesis and parameters of the population.

(MTCETE103C) Transportation Planning

COURSE OUTCOMES

CO1: Understanding the Transportation planning, problems and problem solving process.

CO2: Know the Type of Transportation data and its sources and survey methods.

CO3: Know the Transportation Modes and Technologies.

CO4: Know the Four-stage Sequential Planning.

CO5: Understanding the Urban Forms of Transportation Planning and Modern era models.

(MTCETE104A) Ground Improvement Techniques

COURSE OUTCOMES

CO1: Providing knowledge about ground improvement and ground modification techniques.

CO2: Determining the In-situ densification methods in granular soils & Cohesive soils.

CO3: Analyzing the Mechanical Stabilization of Cement, Lime and Bitumen.

CO4: Determining the components and principles of reinforced earth.

CO5: Providing knowledge about geotextiles, geogrids and its functions.

(MTCETE104B) Intelligent Transportation system

COURSE OUTCOMES

CO1: Understanding Travel Management.

CO2: Applying Modelling and Simulation Techniques.

CO3: Knowledge of Automated Highway Systems.

CO4: Provision of Spacing and Capacity for Different AHS Concepts.

CO5: Assessing ITS Travel Management, Vehicle Positioning System, Electronic Toll Collection and Electronic Car Parking.

(MTCETE104C) Pavement Maintenance System

COURSE OUTCOMES

CO1: Analyzing the Pavement Evaluation and Performance.

CO2: Assess the pavement deformation and behaviour in flexible and rigid pavement.

CO3: Analyzing the Pavement Evaluation & Measuring Equipments.

CO4: Understanding Pavement Overlays and their designs.

CO5: Analysis, Evaluation and Selection of Framework for pavement.

MTCOMRS105: Research Methodology and IPR

COURSE OUTCOMES

- CO1: Students will understand the research problem and approaches of investigation of solutions.
- CO2: Student will learn effective literature studies approaches.
- CO3: Students will be able to study the Nature of Intellectual Property and International Scenario.
- CO4: Students will learn the Scope of Patent Rights and Geographical Indications.
- CO5: knowledge of New Developments in IPR.

MTCETE106 Audit course: syllabus is mentioned at the last

(MTCETE107) Ground Improvement Techniques Lab

COURSE OUTCOMES

- CO1: To study the shear strength parameters and shear.
- CO2: To determine the settlement of soil and different tests performed on it.
- CO3: Students will be able to determine the Lime Content and Short-Term Compression Behavior of soil.
- CO4: To determine the liquid limit, plastic limit and plasticity index of a given soil sample.
- CO5: Knowledge of visual classification of soil.

(MTCETE108) Pavement Analysis and Design Lab

COURSE OUTCOMES

- CO1: Analyzing the Pavement Evaluation and Performance.
- CO2: Assess the pavement deformation and behavior in flexible and rigid pavement.
- CO3: Analyzing the Pavement Evaluation & Measuring Equipments.
- CO4: Understanding Pavement Overlays and their designs.
- CO5: Analysis, Evaluation and Selection of Framework for pavement.

(MTCETE201) Traffic Engineering II

COURSE OUTCOMES

- CO1: Understanding Traffic Forecast.
- CO2: Determining Highway Capacity and Accident Analysis.
- CO3: Identify Traffic Flow Theory and Probabilistic Aspects of Traffic Flow.

- CO4: Know about the Fundamental principle, application of simulation techniques in traffic engineering.
CO5: Identify and determine the Design Hourly Volume for Varying Demand Conditions.

(MTCETE202) Urban Transportation Planning I

COURSE OUTCOMES

- CO1: Students will know the Urban Transportation Problems and Planning.
CO2: Knowledge of Data Collections and inventories.
CO3: Students will be able to understand the UTPS Approach and Trip Generation.
CO4: Understanding the Land use and its interaction.
CO5: Students will know various Transit Networks and System Analysis.

(MTCETE203A) Highway Geometric Design

COURSE OUTCOMES

- CO1: Understand the Design Elements like traffic composition, traffic forecasting, design vehicle, etc.,
CO2: Know the Design Elements like super elevation, widening, transition curves, etc.,
CO3: Know the Cross Section Elements like shoulders, kerbs, camber, etc.,
CO4: Design of Intersections.
CO5: Design of Parking lots.

(MTCETE203B) Highway Construction

COURSE OUTCOMES

- CO1: Students will know the Equipments used in Highway Construction and Sub grades.
CO2: Explanation of Flexible Pavements Layers.
CO3: Students will be able to understand the Cement Concrete Pavement Layers.
CO4: Students will be able to know the Soil Stabilized Pavement Layers and drainage.
CO5: Explanation of Maintenance and Hill Roads.

(MTCETE203C) GIS Application in Transportation Engineering

COURSE OUTCOMES

- CO1: Knowledge of Components of GIS and coordinate systems .
CO2: The students will be able to understand the Geographic Data Representation, Storage, Quality and Standards.
CO3: Understanding the GIS Data Processing, Analysis and Modeling.
CO4: Student will be able to obtain the Applications of GIS in Environment monitoring
CO5: Student will know the Structure of GIS.

(MTCETE204A) Bridge Engineering

COURSE OUTCOMES

- CO1: The students will be able to get the knowledge of the History of Bridge Development.
- CO2: Understanding the Bridge Super structure.
- CO3: Elaborating the Bridge Foundation.
- CO4: Student will be able to obtain the knowledge of the Bridge Construction.
- CO5: Know the Standard specifications for bridges and IRC loadings.

(MTCETE204B) Transportation Facility Design

COURSE OUTCOMES

- CO1: The students will be able to get the knowledge of the Design of highways.
- CO2: Understanding the Terminal Planning & Design Terminal Planning & Design.
- CO3: Evaluation and design of existing geometrics of Highway.
- CO4: Design of Intersections & geometric standards.
- CO5: Identifying the Energy Issues in Transportation and Transportation alternatives.

(MTCETE204C) Quantitative techniques for transportation engineering

COURSE OUTCOMES

- CO1: Understanding the Sampling And Survey Methods.
- CO2: Getting knowledge of Probability Distributions and Application in Traffic Engineering.
- CO3: Know the Hypotheses testing and different Types of error.
- CO4: Solving Simple and Multiple Linear Regression.
- CO5: Assessing different Advanced Techniques like Network Flow Problems.

MTCETE205 Audit course

(MTCETE206) Highway Material Testing Lab

COURSE OUTCOMES

- CO1: To study different aggregate tests.
- CO2: To determine elongation index, flakiness index and fineness modulus of aggregates.
- CO3: Students will be able to perform Marshall stability test and Ductility test.
- CO4: To study different bitumen tests.
- CO5: Students will be able to get the knowledge of Softening test and Standard tar viscometer test.

(MTECTE207) CAD FOR TRANSPORTATION ENGINEERING

COURSE OUTCOMES

- CO1: To study Rotary design.
- CO2: To study different Traffic signals.
- CO3: Students will be able to design parking.
- CO4: To study Public transportation route.
- CO5: Students will be able to plan the transport for a small area.

MTCETE208: Mini Project

(MTCETE301A) Pavement Management System

COURSE OUTCOMES

- CO1: Use of Ranking and Optimisation Methodologies.
- CO2: Knowing the Pavement Performance Prediction.
- CO3: Getting to know the Design Alternatives and Selection.
- CO4: Analysis of Expert Systems and Pavement Management.
- CO5: Knowledge of Types of Distress: Structural and functional.

(MTCETE301B) Mass Transit System Planning

COURSE OUTCOMES

- CO1: Analyze and study of the dynamics response of single degree freedom system using fundamental theory and equation of motion.
- CO2: Analyze and study of Public Transport and Urban Development Strategies.
- CO3: Knowledge of Bus Transit Planning And Scheduling.
- CO4: Analysis of Rail Transit Terminals And Performance Evaluation.
- CO5: Students will get to know the Impact of Transit and Recent Trends in Mass Transportation Planning and Management.

(MTCETE301C) Traffic Flow Theory

COURSE OUTCOMES

- CO1: Know the Traffic stream characteristics and Description using distributions.
- CO2: Analyze and design concepts of Traffic Stream Models.
- CO3: Understanding the Queuing Analysis.
- CO4: Students will be able to get knowledge about the Highway Capacity and Level of Service Studies

CO5: Understanding the Simulation Models and Generation of Inputs.

MTCOMEL302A: Business Analytics

COURSE OUTCOMES

CO1: Knowledge of Business Analytics.

CO2: Visualizing and Exploring Data.

CO3: Understanding the Structures of Business analytics and outsourcing.

CO4: Analysis of Forecasting Techniques and Risk Analysis.

CO5: Recent Trends in business intelligence and Decision Analysis.

MTCOMEL302B: Industrial Safety

COURSE OUTCOMES

CO1: Knowledge of Industrial safety hazards and Safety color codes.

CO2: Functions and responsibility maintenance cost & its relation.

CO3: Understanding wear and corrosion and their prevention.

CO4: Analysis of Fault tracing-concept and Problems in machine tools.

CO5: Periodic and preventive maintenance and repair cycle concept and importance.

MTCOMEL302C Operations Research

COURSE OUTCOMES

CO1: Students should able to apply the dynamic programming to solve problems of discreet and continuous variables.

CO2: Knowledge to apply the concept of non-linear programming.

CO3: Students should able to carry out sensitivity analysis.

CO4: Student should able to model the real world problem and simulate it.

CO5: Understanding Competitive Models, Dynamic Programming and Game Theory.

MTCOMEL302D: Cost Management of Engineering Projects

COURSE OUTCOMES

CO1: Students should able to apply the Cost concepts in decision-making.

CO2: Students should understand the role of each member in project execution.

CO3: Students should able to analyze the Cost Behavior and Profit Planning.

CO4: Understanding the importance of Material Requirement, Quality Management and Budgetary Control.

CO5: Understanding PERT/CPM and Learning Curve Theory.

MTCOMEL302E: Composite Materials

COURSE OUTCOMES

- CO1: Introduction and understanding of Composite materials.
- CO2: Knowledge of different reinforcements and Mechanical Behavior of composites.
- CO3: Students should able to get knowledge of Manufacturing of Metal Matrix Composites and Liquid Metal Infiltration.
- CO4: Students should able to get knowledge of Preparation of Moulding.
- CO5: Understanding Strength of Composite materials.

MTCOMEL302F: Waste to Energy

COURSE OUTCOMES

- CO1: Students should able to understand how to get energy from waste.
- CO2: Knowledge of Biomass Pyrolysis.
- CO3: Knowledge of Biomass Gasification.
- CO4: Knowledge of Biomass Combustion.
- CO5: Understanding Biogas, Bio energy system and biogas Plants.

MTCESE303 Core - Dissertation I

MTCESE401 Core - Dissertation II

AUDIT 1 and 2 : ENGLISH FOR RESEARCH PAPER WRITING

COURSE OUTCOMES

- CO1: Students should know how to Plan and Prepare research paper.
- CO2: Knowledge of Paraphrasing, Plagiarism and Literature review.
- CO3: Knowledge of write every aspect and part of thesis like Abstract, Literature review, Title, etc.,
- CO4: Discussion and skills developed in students when writing the Conclusions.
- CO5: Ensuring students to write the paper first- time and also giving them knowledge about the quality of paper and procedure of Submission.

AUDIT 1 and 2: DISASTER MANAGEMENT

COURSE OUTCOMES

- CO1: Knowledge of disaster and its types.
- CO2: Knowledge of Repercussions of Disasters And Hazards.
- CO3: Study of Seismic Zones and Disaster Prone Areas In India.
- CO4: Study of Disaster Preparedness and Management.

CO5: Understanding Disaster Risk Situation, Risk Assessment and Disaster Mitigation in India.

AUDIT 1 and 2 : SANSKRIT FOR TECHNICAL KNOWLEDGE

COURSE OUTCOMES

CO1: Knowledge of Alphabets in Sanskrit.

CO2: Knowledge of Past/Present/Future Tense.

CO3: Study of Simple Sentences Order.

CO4: Introduction of roots.

CO5: Understanding Technical information and concepts about Sanskrit Literature and related Engineering concepts.

AUDIT 1 and 2 : VALUE EDUCATION

COURSE OUTCOMES

CO1: Knowledge of Values and self-development.

CO2: Understanding the Importance of cultivation of values.

CO3: Study of Personality and Behavior Development.

CO4: Understanding and inculcating Positive Thinking.

CO5: Study of Character and Competence.

AUDIT 1 and 2 : CONSTITUTION OF INDIA

COURSE OUTCOMES

CO1: Knowledge of History and Philosophy of the Indian Constitution.

CO2: Understanding the Contours of Constitutional Rights & Duties.

CO3: Study of Organs of Governance.

CO4: Understanding the Local Administration.

CO5: Study of Election Commission.

AUDIT 1 and 2 : PEDAGOGY STUDIES

COURSE OUTCOMES

CO1: Knowledge of Theories of learning and Conceptual framework.

CO2: Understanding the Pedagogical practices.

CO3: Theory of change when pedagogical practices are done.

CO4: Understanding the Professional development and Barriers to learning.

CO5: Study of Research gaps and future directions.

AUDIT 1 and 2: STRESS MANAGEMENT BY YOGA

COURSE OUTCOMES

- CO1: Knowledge of Eight parts of yog (Ashtanga).
- CO2: Understanding the Do`s and Don`t`s in life.
- CO3: Knowledge of Ahinsa, satya, astheya, bramhacharya, aparigraha, Shaucha, santosh, tapa, swadhyay, ishwarpranidhan.
- CO4: Pracicing Asan and Pranayam..
- CO5: Regularization of breathing techniques and its effects.

AUDIT 1 and 2: PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

COURSE OUTCOMES

- CO1: Knowledge of Neetisatakam - Holistic development of personality.
- CO2: Approach to day to day work and duties.
- CO3: Theory of Statements of basic knowledge.
- CO4: Understanding the Personality of Role model. Shrimad Bhagwad Geeta.
- CO5: Study of Personality Development through Life Enlightenment Skills.

ELECTRICAL ENGINEERING

COURSE OUTCOMES

(MTEEPS101) COURSE OUTCOMES OF POWER SYSTEM ANALYSIS OF POWER SYSTEMS

- CO1: To calculate voltage phasor at all buses, given the data using various methods of load flow
- CO2: Study various methods of load flow and their advantages and disadvantages
- CO3: To rank various contingencies according to their severity in terms of bus voltage and line loading
- CO4: Study voltage instability phenomenon
- CO5: To estimate the bus voltage phasor given various quantities viz. power flow, voltages, taps, CB status etc
- CO6: Understand how to analyze various types of faults in power system

(MTEEPS102) POWER SYSTEM DYNAMICS-I OF POWER SYSTEMS

- CO1: Understand the modeling of synchronous machine in details
- CO2: Carry out simulation studies of power system dynamics using MATLAB-SIMULINK, MI POWER
- CO3: Carry out stability analysis with and without power system stabilizer (PSS)
- CO4: Understand the load modeling in power system
- CO5: Study the effect of excitation system and voltage stability of the power system.
- CO6: To explain the multi machine stability and asynchronous operation.

(MTEEPS103A) RENEWABLE ENERGY SYSTEM OF POWER SYSTEMS

- CO1: Understand the renewable sources in distributed generation (DG)
- CO2: To understand siting, sizing, optimal placement & grid integration of DG sources in distribution and transmission systems.
- CO3: To study the economics, reliability aspects of DGs.
- CO4: To apply modeling techniques to micro grid with multiple DGs and study the transients.
- CO5: To analyze the steady state and dynamic performance in control of DG systems.

(MTEEPS103B) SMART GRIDS OF POWER SYSTEMS

- CO1: To study the power quality problems associated with integration of renewable energy sources in smart grid.
- CO2: Formulate solutions in the areas of smart substations, distributed generation and wide area measurements.
- CO3: Come up with smart grid solutions using modern communication technologies
- CO4: To apply smart metering concepts to industrial and commercial installations.
- CO5: Appreciate the difference between smart grid & conventional grid.

(MTEEPS103C) HIGH POWER CONVERTERS OF POWER SYSTEMS

- CO1: Understand the characteristics of different semiconductor devices and their applications in different converters.
- CO2: Gain knowledge about different AC voltage controllers and their control.
- CO3: Design gate drive circuits and protective circuits for semiconductor devices
- CO4: Know about the requirement and working phenomenon of power conditioners and UPS.
- CO5: Know about different topologies of multi-level inverters and also PWM techniques used in VSI and CSI.

(MTEEPS103D) WIND AND SOLAR SYSTEMS OF POWER SYSTEMS

- CO1: Understand the development and current status of wind and solar system.
- CO2: Know the characteristics of wind power generation and its integration with transmission and distribution network.
- CO3: Know about Solar power systems and its applications.
- CO4: PV power generation, Energy Storage device. Designing the solar systems for small installations.
- CO5: Impacts on power systems dynamics, power systems interconnection.

(MTEEPS104A) ELECTRICAL POWER DISTRIBUTION SYSTEM OF POWER SYSTEMS

- CO1: Understand Introduction to SCADA and its application
- CO2: Know the AI techniques applied to Distribution Automation.
- CO3: To find the optimal placement of switching devices in distribution network to minimize losses and improve the performance
- CO4: Provides an idea regarding distribution management system, interconnected power system and power system automation.
- CO5: To study different aspects of distribution system maintenance and energy management.

(MTEEPS104B) ELECTRICAL MATHEMATICAL METHODS FOR POWER ENGINEERING OF POWER SYSTEMS

- CO1: Knowledge about vector spaces, linear transformation, Eigen values and eigenvectors of linear operators.
- CO2: To learn about linear programming problems and understanding the simplex method for solving linear programming problems in various fields of science and technology
- CO3: Acquire knowledge about nonlinear programming and various techniques used for solving constrained and unconstrained nonlinear programming problems
- CO4: Understanding the concept of random variables, functions of random variable and their probability distribution
- CO5: Understand stochastic processes and their classification.

(MTEEPS104C) ELECTRICAL PULSE WIDTH MODULATION FOR PE CONVERTERS OF POWER SYSTEMS

- CO1: To study development in modulation scheme and its application for unbalanced voltage system.
- CO2: To provide the students a deep insight in to the power electronics converters and its modulation techniques.
- CO3: To study the necessity of providing minimum pulse width and its effect.

CO4: To study development in modulation scheme and its application for unbalanced voltage system.

(MTEEPS104D) ELECTRIC AND HYBRID VEHICLES OF POWER SYSTEMS

CO1: Learn the basic concepts, mathematical models and social/environmental importance of hybrid and electric vehicles

CO2: Learn about energy management in hybrid and electric vehicle

CO3: To understand and learn about different drive applications

CO4: To learn fundamental concepts of hybrid tractions, hybrid drive-train topologies and hybrid drive-train topologies

(MTEEPS105) RESEARCH METHODOLOGY AND IPR OF POWER SYSTEMS

CO1: Apply statistical principles for conducting hypothesis testing.

CO2: Acquire knowledge of the various intellectual property rights.

CO3: Disseminate the scientific method as a structured way of conducting scientific research.

CO4: Conduct effective review of literature and write technical reports.

(MTEEPS201) DIGITAL PROTECTION OF POWER SYSTEM OF POWER SYSTEMS

CO1: Learn the basic requirements of digital protection

CO2: Apply Mathematical approach towards protection

CO3: Learn the importance of Digital Relays.

CO4: Learn numerical protection on various power system elements.

CO5: Learn to develop various Protection algorithms

(MTEEPS202) POWER SYSTEM DYNAMICS-II OF POWER SYSTEMS

CO1: To analyze the rotor angle stability and design techniques to improve the stability of the system.

CO2: Study the effect of excitation system and voltage stability of the power system.

CO3: To explain the multi machine stability and asynchronous operation.

CO4: To understand the modeling of automatic generation control of single area and multiarea system and sub

CO5: To analyze the small signal stability of the power system

(MTEEPS203A) RESTRUCTURED POWER SYSTEMS OF POWER SYSTEMS

CO1: To describe the working and various other aspects of restructured power system.

CO2: Discuss the recent trends and applications in restructured markets.

CO3: Classify different market mechanisms and summarize the role of various entities in the market.

CO4: To Identify the need of regulation and deregulation.

CO5: Describe the Technical and Non-technical issues in Deregulated Power Industry.

(MTEEPS203B) ADVANCED DIGITAL SIGNAL PROCESSING OF POWER SYSTEMS

CO1: Analyze and implement power spectrum estimation techniques.

- CO2: Analyze, design and implement digital systems using the DFT and (FFT).
- CO3: Design and analyze frequency-selective digital filters using various filtering methods.
- CO4: Learn the Principles of adaptive filtering and implement algorithms of adaptation
- CO5: Acquire the basics of multi rate digital signal processing.

(MTEEPS203C) DYNAMICS OF ELECTRICAL MACHINES OF POWER SYSTEMS

- CO1: To study the concept of synchronous machine system.
- CO2: To study the machine dynamics and its stability analysis.
- CO3: To understand the transient study using transformed equation and to study the DC generator and DC motor system
- CO4: To study the torque dynamics of primitive modeled DC machine, induction motor dynamics, transformed equation and various reference frame theories of induction motor.
- CO5: To analyze the concept of synchronous machine and its analysis.

(MTEEPS203D) POWER APPARATUS DESIGN OF POWER SYSTEMS

- CO1: To design Computer Aided Electrical Machine.
- CO2: To model and design all types of rotating machines including special machines.
- CO3: To model all rotating machines under both transient and steady state conditions with the dimensions and material used.
- CO4: To apply the knowledge of the electrical apparatus in industry oriented applications.
- CO5: To analyze and design a transformer with general considerations such as emf per turn, choice of flux density and current density, main dimensions, leakage reactance and conductor size etc.

(MTEEPS204A) ADVANCED MICRO-CONTROLLER BASED SYSTEMS OF POWER SYSTEMS

- CO1: To program a microcontroller or microprocessor using assembly language.
- CO2: To configure and use different peripherals in a digital system
- CO3: To understand the operation of different microcontrollers as well as DSP based systems
- CO4: To Understand the architecture and organization of a microcontroller or microprocessor
- CO5: To compile and debug a program and generate an executable file and use it

(MTEEPS204B) SCADA SYSTEM AND APPLICATIONS OF POWER SYSTEMS

- CO1: Various architectures of SCADA systems with their advantages and limitations
- CO2: Basic knowledge on supervisory control and their applications
- CO3: Knowledge on applications of SCADA systems on distribution sector and in various industries.
- CO4: Overview on single unified standard architecture IEC 61850
- CO5: Learn about remote terminal units, PLCs, intelligent electronic devices, HMI systems, SCADA server.

(MTEEPS204C) POWER QUALITY OF POWER SYSTEMS

- CO1: To model power systems under non-sinusoidal condition for transient studies.
- CO2: To design model reference adaptive systems for power quality problems

- CO3: To understand importance of power quality with power quality issues & standards
- CO4: To understand and analyze the solutions to mitigate power quality problems
- CO5: To design variable structure control for power quality systems

(MTEEPS204D) AI TECHNIQUES OF POWER SYSTEMS

- CO1: Explore different techniques to solve artificial intelligence problems by searching.
- CO2: Envisage the need of quantifying uncertainty and probabilistic reasoning.
- CO3: Demonstrate the fundamental principles of intelligent systems.
- CO4: Conceive the concepts of knowledge representation and inference mechanism.
- CO5: Apply the fuzzy reasoning rules and knowledge representation in real life problem solving.

(MTEEPS301A) POWER SYSTEM TRANSIENTS OF POWER SYSTEMS

- CO1: Describe the formation and characteristics of travelling waves in transmission line
- CO2: Model power apparatus under transient conditions.
- CO3: Explain the various sources of electromagnetic transient.
- CO4: Apply insulation co-ordination principles.
- CO5: Understand Principle of digital computation.

(MTEEPS301B) FACTS AND CUSTOM POWER DEVICES OF POWER SYSTEMS

- CO1: Describe the Reactive power flow control in Power Systems
- CO2: Describe about various compensation methods.
- CO3: Power quality operation and control methods.
- CO4: Know about various FACTS devices and its applications.
- CO5: Know about SSR and its damping Unified Power Flow Controller.

(MTEEPS301C) INDUSTRIAL LOAD MODELING AND Control OF POWER SYSTEMS

- CO1: Present scenario of electrical energy.
- CO2: Know about electric energy pricing methods.
- CO3: Selection of Schemes Optimal Operating Strategies
- CO4: Know about Energy banking, Industrial Cogeneration.
- CO5: Optimal operation of load distribution.

(MTEEPS301D) INDUSTRIAL LOAD MODELING AND Control OF POWER SYSTEMS

- CO1: Know State variable representations of systems.
- CO2: Analyze linear time varying systems.
- CO3: State space representation of discrete systems and provide solutions to it.
- CO4: Know about State feedback of linear discrete time systems, design of observers with MATLAB Exercises.
- CO5: Ackerman's Formula - stabilization by output feedback.

(MTCOMEL302A) BUSINESS ANALYTICS OF POWER SYSTEMS

- CO1: Understand the role of business analytics within an organization.
- CO2: Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization.
- CO3: To become familiar with processes needed to develop, report, and analyze business data.
- CO4: Analyze and solve problems from different industries such as manufacturing, service, retail, software, banking and finance, sports, pharmaceutical, aerospace etc.
- CO5: Use decision-making tools/Operations research techniques.

(MTCOMEL302B) INDUSTRIAL SAFETY OF POWER SYSTEMS

- CO1: Understand the role industrial safety.
- CO2: Understand fundamentals of maintenance engineering.
- CO3: Learn different methods of Wearing and Corrosion and their prevention.
- CO4: Trace out the faults occurring in various electrical systems.
- CO5: Know about Periodic and preventive maintenance of various systems.

(MTCOMEL302C) OPERATIONS RESEARCH OF POWER SYSTEMS

- CO1: Should able to carry out sensitivity analysis.
- CO2: Should able to model the real world problem and simulate it.
- CO3: Should able to apply the dynamic programming to solve problems of discreet and continuous variables.
- CO4: Should able to apply the concept of non-linear programming
- CO5: Should be able to formulate optimization techniques.

(MTCOMEL302D) COST MANAGEMENT OF ENGINEERING PROJECTS OF POWER SYSTEMS

- CO1: Should able to do cost management for various projects.
- CO2: Should able to understand the meaning of cost management.
- CO3: Should able to analyze Cost Behavior and Profit Planning.
- CO4: Understand Quantitative techniques for cost management
- CO5: Analyze the pricing and apply for various projects.

(MTCOMEL302E) COMPOSITE MATERIALS OF POWER SYSTEMS

- CO1: Understand Definition - Classification and characteristics of Composite materials.
- CO2: Know about Reinforcements.
- CO3: Know about manufacturing of Metal Matrix Composites.
- CO4: Know about manufacturing of Polymer Matrix Composites:
- CO5: Know about strength and laminates.

(MTCOMEL302F) WASTE TO ENERGY OF POWER SYSTEMS

- CO1: Know about various forms of Energy wastage.
- CO2: Know about Biomass introduction.

- CO3: Know about Biomass gasifiers.
- CO4: Know about Biogas properties.
- CO5: Know about Biomass combustion.

AUDIT COURSES

AUDIT 1 and 2: ENGLISH FOR RESEARCH PAPER WRITING

- CO1 Understanding basic Sanskrit language
- CO2 Ancient Sanskrit literature about science & technology can be understood
- CO3 Being a logical language will help to develop logic in students

VALUE EDUCATION

- CO1 Knowledge of self-development
- CO2 Learn the importance of Human values
- CO3 Developing the overall personality

CONSTITUTION OF INDIA

- CO1 Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- CO2 Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
- CO3 Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
- CO4 Discuss the passage of the Hindu Code Bill of 1956.

PEDAGOGY STUDIES

- CO1 What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
- CO2 What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
- CO3 How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

STRESS MANAGEMENT BY YOGA

- CO1 Students will be able to: 1. Develop healthy mind in a healthy body thus improving social health also
- CO2 Improve efficiency

PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

- CO1 Study of Shrimad – Bhagwad - Geeta will help the student in developing his personality and achieve the highest goal in life

- CO2 The person who has studied Geeta will lead the nation and mankind to peace and prosperity
- CO3 Study of Neetishatakam will help in developing versatile personality of students.