JAYAWANT SHIKSHAN PRASARAK MANDAL's
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(Approved by AICTE, New Delhi, Govt of Maharashtra and Affiliated to University of Pune)
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M.E. Ph.D. (Electronics Engg.)
LMISTE, FIETE, SMIEEE
Principal

Institute Vision Mission

Vision

To satisfy the aspirations of youth force, who wants to lead nation towards prosperity through techno-economic development

Mission

To provide, nurture and maintain an environment of high academic excellence, research and entrepreneurship for all aspiring students, which will prepare them to face global challenges maintaining high ethical and moral standards.

Program outcomes

PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems.

PO 2: Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles ofmathematics, natural sciences, and engineering sciences.

PO 3: Design/Development of Solutions: Design solutions for complex engineering problems and design system componentsor processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.

PO 4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction andmodelling to complex engineering activities with an understanding of the limitations

PO 6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice

PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions

PO 11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological cha

Class: FE (Common to all)

Course: Engineering mathematics - I **Course Code: C101**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Students will able to find rank of matrix by Normal, Echelon form , Solution of systems of linear equations by matrix method, orthogonality of matrices ,linear transformation and Eigen values, Eigen vectors, essential in various engineering problems.
CO2	Students will able to find roots of algebraic equation by Complex Numbers.
CO3	Student will able to find Convergence and divergence of an infinite series and find nth derivative of product of functions by Leibnitz's theorem.
CO4	Find Taylor's and Maclaurian series expansion of differentiable functions.
CO5	Students will able to find Partial derivative of functions of two and three variables and total derivatives.
CO6	Student will understand Maxima minima of functions of two variable error and approximate values of function. Also, examine the functional dependency using Jacobin.

Course: Engineering Physics **Course Code: C102**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Analyze basic knowledge of optics for engineering & technological problems and apply to few engineering applications.
CO2	Explain and utilize the concept of laser for scientific, industrial & medical applications also laser used in communication with use of optic fiber.
CO3	Understand basic concepts of quantum mechanics for developing mathematical & analytical abilities in wave mechanics.
CO4	Apply knowledge of semiconductor physics to anyalze recent trends & advances in technological development.
CO5	Understand properties of magnetism and superconductors for technical applications.
CO6	Explain Different techniques of NDT and basics of nano-materials

Course: Basic electrical Engineering **Course Code: C103**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Demonstrate and measurement of resistance with the variation of temperature, importance of insulation resistance, classification and evaluation of energy consumption through energy conversion.
CO2	Summerize the fundamentals of electromagnetism, compare electrical and magnetic circuit, make use of magnetic circuit concepts to solve the numericals.
CO3	Apply the concepts of electromagnetic induction to analyze the principle of transformer and summarize the concepts of electrostatics.
CO4	Extend the concept of electromagnetic induction for generation of ac and its representation for practical analysis of ac circuits
CO5	Illustrate the concepts of single and three phase ac circuits along with the phasor diagrams.
CO6	Simplify the networks and provide the solution by applying Kirchhoff's laws and theorems

Course: Basic civil and environmental engineering **Course Code: C104**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	To understand role of civil engineers in different areas of civil engineering with Interdisciplinary approach.
CO2	To study different construction materials and components of a structure.
CO3	To study different types of maps and modern surveying tools and techniques
CO4	To understand concept of environment and the role of civil engineers in sustainable development.
CO5	To study various principles of building planning and concept of green building.
CO6	To classify energy and environmental pollution.

Course: Engineering Graphics-I **Course Code: C105**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	To identify reference, principal, auxiliary planes and utilize fundamentals of engineering drawing to draw and interpret projection of lines.
CO2	To apply concept of change of position and auxiliary plane method for projection of different types of planes
CO3	To draw, understand and explain projection of solids resting on HP
CO4	To draw various types of engineering curves and development of lateral surfaces of solids
CO5	To draw orthographic views of given pictorial view.
CO6	To observe and understand two dimensional engineering drawings for imagining and constructing three dimensional drawing

Course: Engineering mathematics - II **Course Code: C106**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Understand the concept of Differential equation and various methods of solution of first order first degree differential equation.
CO2	Apply knowledge of differential equation in physical systems such as Newton's law of cooling, L-C-R circuits, rectilinear motion , mass spring systems heat transfer etc.
CO3	Analysis of continuous and discrete system, where knowledge of Fourier series and Harmonic analysis is required and different methods to evaluate integrals.
CO4	Advanced technique to evaluate integrals and measurement of arc lengths of various curves.
CO5	Understand the vector calculus that arise in equation of sphere, cone and cylinder.
CO6	Multiple integrals which are used in calculating areas, volumes, mean and Root mean square values mass, moments of inertia and Centre of gravity.

Course: Engineering Chemistry **Course Code: C107**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Student will be able to apply different methodologies for analysis of water, techniques for softening of water and concept of green chemistry in synthesis of various chemical compounds.
CO2	Student will be able to utilize analytical methods for analysis of various chemical compounds.
CO3	Student will be able to identify different types of polymer, their preparation methods, properties and applications in various fields.
CO4	Student will be able to analyze quality of fossil and derived fuels on the basis of their composition.
CO5	Student will be able to explain the importance of carbon and hydrogen compounds in the development of modern technologies.
CO6	Student will be able to explain causes for corrosion and its preventive methods.

Course: Engineering Mechanics **Course Code: C108**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	To determine resultant of coplanar force systems and CG of plane area and wire bends.
CO2	To analyse straight line motion of a particle with constant and varying acceleration by kinematic and Kinetic approach.
CO3	To analyse the curvilinear motion of a particle in rectangular, path and polar co-ordinate systems by kinematic and Kinetic approach.
CO4	To solve problems for a particle in motion and practical undergoing impact by applying work, energy, impulse and momentum relationships.
CO5	To draw FBD to determine forces on rigid bodies under equilibrium and resultant of space forces.
CO6	To use equilibrium conditions to determine internal and external forces on plane trusses, plane frames, cables and bodies undergoing friction.

Course: Basic electronics Engineering **Course Code: C109**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Apply the concepts of PN junction and special purpose diode to describe operation of basic diode circuits and to draw input-output waveforms
CO2	Explain configuration, biasing, characteristics, parameters and application of transistor.
CO3	Describe modes, parameter, feedback and applications of operational amplifier
CO4	Design digital circuits using logics gates with precise output and optimum use of logic gates.
CO5	Classify power devices and transducers with respect to applications and state applications of transducers
CO6	List basic components of electronics communication system, Distinguish between transmission medias, Describe need of modulation and draw architecture of GSM.

Course: Basic Mechanical Engineering **Course Code: C110**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Understand the scope of mechanical engineering, & explain various machine elements.
CO2	Elaborate the steps in design process
CO3	Select different manufacturing processes for given engineering applications
CO4	Select machine tools for manufacturing of machine components.
CO5	Explain the basic concepts of thermodynamics, principle of energy conservation and conversion
CO6	Identify and explain different power producing devices and power consuming devices

Course: Fundamentals of Programming Language-I **Course Code: C111**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Develop C programs using different control structures and pointers
CO2	Identify different data structures and use of functions
CO3	Apply the knowledge of Open Source Operating Systems and able to use different programming tools
CO4	Apply basics concept of "C" programming language to solve real word problems.

Course: Fundamentals of Programming Language-II **Course Code: C112**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO3	Design program involving structure and union.
CO4	Apply the concept of OOPs in data structure.
CO5	Built webpage using HTML.
CO6	Use modern engineering tool to develop application program for android phone and embedded system.

Department of Computer Engineering

Vision

"To be a leading educational center for grooming computer engineers to serve the society."

Mission

M1: To develop computer professionals by providing quality education.

M2: To assimilate academics, research and entrepreneurship skills to accomplish real word challenges.

Program Educational Objective (PEO)

PEO1: The graduates shall have an ability to identify, analyze & solve problems in computer engineering field using fundamental domain knowledge and programming tools

PEO2: The graduates shall have an ability to apply core technical competencies in diversified areas with good leadership and teamwork abilities.

PEO3: The graduates shall aspire for entrepreneurship, research and higher studies in computer engineering field

PSO: Program specific outcomes

PSO1: Specify design, develop and test the software systems in the areas of computer networking ,database management, embedded systems ,image processing, big data etc. to satisfy user requirements

PSO2: Analyze and optimize given algorithms or systems for performance improvements

PSO3: Design hardware and software for concurrent and parallel programming

Class: SE

Course: Discrete Mathematics **Course Code: 210241**

After the completion of the course, students will be able to

CO201.1	Illustrate concept of set theory, proposition & mathematical induction.
CO201.2	Analyze real world problems logically using function and relation models and interpret the associated operations and terminologies in context.
CO201.3	Apply the principles of permutation and combination for various applications.
CO201.4	Compute Laplace transform and develop the ability analyze system by using properties
CO201.5	Define and understand the basic concept of probability, random variables, random signals and Calculate Correlation, CDF, PDF and probability of a given event.

Course: Digital Electronics and logic Design Course Code: 210242

After the completion of the course, students will be able

CO202.1	Design and implement Combinational digital circuits using Boolean Algebraic simplifications methods.
CO202.2	Design and implement Sequential digital circuits as per the specifications.
CO202.3	Construct ASM Chart and Design the minimum systems using VHDL
CO202.4	Design Combinational Circuits and Sequential Circuits using PLD's
CO202.5	Apply the knowledge to select the logic families IC packages as per the design specifications
CO202.6	Develop minimum embedded system for simple real world application

Course: Data structure and algorithm Course Code: 210243

After the completion of the course, students will be able

CO203.1	Able to analyse different problems and Apply algorithmic strategy for efficient solutions.
CO203.2	Able to analyse characteristics of linear data structure and design social networking and Maps applications.
CO203.3	Able to design and implement solutions for different problems using various types of linked list.
CO203.4	Apply and implement concept of stack for non-recursive function, expression conversion and evaluation.
CO203.5	Choose and Implement different queue according to application.
CO203.6	Implement different searching and sorting algorithm.

Course: Computer Organisation and Architecture **Course Code: 210244**

After the completion of the course, students will be able to:

CO204.1	Analyze design issues of digital computer in terms of speed,technology,cost and performance
CO204.2	Analyze performance characteristics of memory hierachy.
CO204.3	Evaluate different methods for computer I/O mechanism.
CO204.4	Develop assembly language program for given task for 8086 microprocessor.
CO204.5	Evaluate various design alternatives in processor organisation
CO204.6	Evaluate various design alternatives of control unit.

Course: Object Oriented Programming **Course Code: 210245**

After the completion of the course, students will be able

CO205.1	Understand & Analyze concepts of Object Oriented Programming.
CO205.2	Apply OOP principles for effective programming.
CO205.3	Develop programming application using Virtual Function.
CO205.4	Apply concept of Templates & Exception handling to develop programming
CO205.5	Understand concept of Data hierarchy & Files- streams
CO205.6	Understand concept of STL & develop Algorithm for Searching-Sorting

Course: SOFT SKILLS **Course Code: 210249**

After the completion of the course, students will be able

CO209.1	Effectively communicate through verbal/oral communication and improve the listening skills
CO209.2	Write precise briefs or reports and technical documents.
CO209.3	Actively participate in group discussion / meetings / interviews and prepare & deliver presentations.
CO209.4	Become more effective individual through goal/target setting, self-motivation and practicing creative thinking.

Course: Engineering Mathematics –III **Course Code: 207003**

After the completion of the course, students will be able

CO210.1	Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits.
CO210.2	Solve problems related to Fourier transform, Z-Transform and applications to Signal and Image processing.
CO210.3	Apply statistical methods like correlation, regression analysis and probability theory for analysis and prediction of a given data as applied to machine intelligence.
CO210.4	Perform vector differentiation and integration to analyze the vector fields and apply to compute line, surface and volume integrals. Analyze conformal mappings, transformations and perform contour integration of complex functions required in Image processing, Digital filters and Computer graphics.

Course: Computer Graphics **Course Code: 210251**

After the completion of the course, students will be able

CO211.1	Apply knowledge of geometric, mathematical and algorithmic concepts required for elementary graphics operations.
CO211.2	To understand and implement the concept of polygon filling, windowing and clipping.
CO211.3	To design and implement interactive 2D and 3D computer graphics.
CO211.4	Design and develop graphics applications using modern tools like Blender by applying the knowledge of color models.
CO211.5	Understand strategic approach to solve problems in the domain of Computer Graphics.
CO211.6	Understand strategic approach to solve problems in the domain of Computer Graphics.

Course: Advanced Data Structure **Course Code: 210252**

After the completion of the course, students will be able

CO212.1	Solve problems using tree algorithm for given input.
CO212.2	Apply various graph algorithms on given data set.
CO212.3	Implement hash tables using various collision resolution methods for efficient search on given data.
CO212.4	Use various dynamic and static tree techniques to optimize search.
CO212.5	Implement multiWay tree using different indexing technique for efficient search.
CO212.6	Apply various file organization techniques to organize given database.

Course: Microprocessor **Course Code: 210253**

After the completion of the course, students will be able

CO213.1	Analyze architectures of advanced processors and its resources.
CO213.2	Apply assembly language programming to develop small real life embedded application.
CO213.3	Implement math coprocessor to perform mathematical calculations
CO213.4	Evaluate different processor configurations.

Course: Principals of Programming Languages **Course Code: 210254**

After the completion of the course, students will be able

CO314.1	To analyze the strengths and weaknesses of programming languages for effective and Efficient program development.
CO314.2	To apply the principles and paradigms underlying the programming languages enabling to learn new programming languages
CO314.3	To analyze different programming paradigms
CO314.4	To apply programming paradigms effectively in application development.
CO314.5	To analyze advanced features of Java programming language (CBS)

Class: TE

Course: Theory Of Computation **Course Code: 310241**

After the completion of the course, students will be able

CO301.1	Apply the concept of automata theory in computer based applications.
CO 301.2	Apply the concept of regular expression for given problem.
CO 301.3	Implement linguistic theory based on grammar
CO 301.4	Design deterministic Turing machine for all inputs and outputs.
CO 301.5	Design Push down Automata for all suitable inputs and outputs
CO 301.6	Subdivide problem space based on inputs subdivision using constraints.

Course: Database Management System **Course Code: 310242**

After the completion of the course, students will be able

CO302.1	To Design E-R Model for given requirements and convert the same into database tables.
CO302.2	To Use database techniques such as SQL & PL/SQL.
CO302.3	To Use modern database techniques such as NOSQL
CO302.4	To Explain transaction Management in relational database System.
CO302.5	To Describe different database architecture and analyses the use of appropriate architecture in real time environment.
CO302.6	To Use advanced database Programming concepts Big Data – HADOOP

Course: Software Engineering and Project Management **Course Code:310243**

After the completion of the course, students will be able

CO303.1	To do Selection of s/w processing model for s/w system by comparing models
CO303.2	To analyse the s/w Requirement & carryout feasibility study.
CO303.3	To design s/w system using appropriate method.
CO303.4	To Schedule and execute a project considering the risk management.
CO303.5	To do cost estimation by Planning of s/w system
CO303.6	To execute test by for quality improvement

Course: Information Systems and Engineering Economics **Course Code: 310244**

After the completion of the course, students will be able

CO304.1	Analyse the need & importance of an information system.
CO304.2	Analyse the activities in managing, designing, planning, implementation and analyse the activities in managing, designing, planning, implementation and deployment of computerized system in Information System. Employment of computerized system in Information System.
CO304.3	Analyse various Information System solutions like ERP, CRM, Data warehouses and the issues in successful implementation of these technology solutions.
CO304.4	Outline the past history, present position and expected performance of a company engaged in engineering practice or in the computer industry.
CO304.5	Evaluate present worth, future worth and annual worth analyses ,economic alternatives
CO304.6	Evaluate benefit/cost, lifecycle and breakeven analysis on one or more economic alternatives

Course: Computer Networks **Course Code: 310245**

After the completion of the course, students will be able

CO305.1	Implement logical link control algorithms for error detection during data transmission
CO305.2	To Analyze the performance of different routing and MAC protocols to achieve QoS parameters in Network
CO305.3	Implement application layer protocols for communication using sockets

Course: Design Analysis and algorithm **Course Code: 310250**

After the completion of the course, students will be able

CO309.1	Describe various aspects of algorithm and analyse the asymptotic performance of algorithms
CO309.2	Describe different models and solve problems using greedy strategy.
CO309.3	Describe and apply different algorithmic design techniques.
CO309.4	Classify different types of problems and analyse performance with the help of complexity theory
CO309.5	Describe Amortized analysis, Embedded algorithms and solve the problems using randomizedand approximation algorithms.
CO309.6	Apply and analyse Multithreaded, Distributed algorithm and string matching algorithms.

Course: System Programming and operating System **Course Code: 310251**

After the completion of the course, students will be able

CO310.1	To analyse system software's like editors, loaders, debuggers, compilers and implement two-pass assembler
CO310.2	To analyze linkers and loaders and implement macro processor
CO310.3	Able to use tools like lex and yacc.
CO310.4	Implement process scheduling algorithms and apply bankers algorithm to avoid deadlocks in real time applications
CO310.5	Implement and compare different page replacement schemes
CO310.6	Apply and analyse Multithreaded, Distributed algorithm and string matching algorithms

Course: Embedded System and Internet of Things **Course Code: 310252**

After the completion of the course, students will be able

CO311.1	Implement an architectural design for IoT for specified requirement
CO311.2	Solve the given societal challenge using IoT
CO311.3	Choose between available technologies and devices for stated IoT challenge

Course: Software Modeling and Design **Course Code: 310253**

After the completion of the course, students will be able

CO312.1	Choose between available technologies and devices for stated IoT challenge
CO312.2	Design an application using UML Static modeling as fundamental tool.
CO312.3	Design an application using UML Dynamic modeling as fundamental tool.
CO312.4	Evaluate appropriate modern tool for designing and modeling
CO312.5	Apply design patterns to understand reusability in OO design.
CO312.6	Apply appropriate modern testing tool for testing web-based/desktop application

Course: Web Technology **Course Code: 310254**

After the completion of the course, students will be able

CO313.1	Analyse given assignment to select sustainable web development design methodology.
CO313.2	Develop web based application using suitable client side and server side web technologies
CO313.3	Develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management

Course: Seminar & Technical Communication **Course Code: 310255**

After the completion of the course, students will be able

CO314.1	To be familiar with basic technical writing concepts and terms, such as audience analysis, jargon, format, visuals, and presentation.
CO314.2	To improve skills of reading, understanding, and interpreting material on technology.
CO314.3	To improve communication and writing skills

Class: BE

Course: High Performance Computing **Course Code: 410241**

After the completion of the course, students will be able

CO401.1	To analyze different parallel architectures, inter-connect networks, programming models
CO401.2	To develop an efficient parallel algorithm to solve given problem
CO401.3	To analyze and measure performance of modern parallel computing systems
CO401.4	To deploy parallel computing architectures to develop real time applications viz distributed applications, cloud computing etc .

Course: Artificial Intelligence and Robotics **Course Code: 410242**

After the completion of the course, students will be able

CO402.1	To Identify and apply suitable Intelligent agents for various AI applications
CO402.2	To Design smart system using different informed search / uninformed search or heuristic approaches.
CO402.3	To Identify knowledge associated and represent it by ontological engineering to plan a strategy to solve given problem.
CO402.4	To Apply the suitable algorithms to solve AI problems
CO402.5	To Implement crypto-arithmetic problems using AI
CO402.6	To Design and Implement mini project using AI

Course: Data Analytics **Course Code: 410243**

After the completion of the course, students will be able

CO403.1	To develop problem solving abilities using mathematics.
CO403.2	To apply algorithmic strategies while solving problems.
CO403.3	To develop time and space efficient algorithm.
CO403.4	To study algorithmic example in distributed, concurrent and parallel environments.

Course: ELE I-**Data Mining and Warehousing** **Course Code: 410244**

After the completion of the course, students will be able

CO404.1	Apply basic, intermediate and advanced techniques to mine the data
CO404.2	Analyse the output generated by the process of data mining
CO404.3	Explore the hidden patterns in the data
CO404.4	Optimize the mining process by choosing best data mining technique

Course: ELE II – **Mobile Communication** **Course Code: 410245**

After the completion of the course, students will be able

CO405.1	Understand basic components and concept of radio spectrum for PCS.
CO405.2	Justify the Mobile Network performance parameters and design decisions.
CO405.3	Choose the proper modulation technique for mobile network based on requirement.
CO405.4	Study GSM/CDMA mobile network layout considering futuristic requirements which conforms to the technology.
CO405.5	Study Current 3G and 4G Technologies for GSM and CDMA with bandwidth capacity planning.
CO405.6	Percept the requirements of next generation mobile network and mobile applications.

Course: Machine Learning **Course Code: 410250**

After the completion of the course, students will be able

CO409.1	To understand human learning aspects and relate it with machine learning concepts.
CO409.2	To apply machine learning algorithm by understand nature of the problem
CO409.3	To Find optimized solution for given problem.

Course: Information and Cyber Security **Course Code: 410251**

After the completion of the course, students will be able

CO410.1	Gauge the security protections and limitations provided by today's technology.
CO410.2	Identify information security and cyber security threats.
CO410.3	Analyze threats in order to protect or defend it in cyberspace from cyber-attacks.
CO410.4	Build appropriate security solutions against cyber-attacks.

Course: EL-III- Embedded Real time Operating System **Course Code: 410252**

After the completion of the course, students will be able

CO411.1	Recognize and classify embedded and real-time systems
CO411.2	Implement communication bus protocols used for embedded and real-time systems
CO411.3	Classify and Implement scheduling algorithms
CO411.4	Apply software development process to a given RTOS application
CO411.5	Design a given RTOS based application

Course: EL-IV(Cloud Computing) **Course Code: 410253**

After the completion of the course, students will be able

C412.1	To Describe fundamental concepts of Cloud Computing
C412.2	To Compare different data storage technique and Cloud Based Solutions
C412.3	To Install virtual cloud and Implement virtualization in cloud.
C412.4	To Develop a application using amazon web service.
C412.5	To install Cloud Computing environment and relate with Internet of things.
C412.6	To develop an application using existing or Azure cloud.

Department of Electrical Engineering.

Department Vision Mission

Vision

"To be a center of developing competent Electrical Engineer for sustainable industrial and societal growth"

Mission

M1: To develop competent professionals through design and implementation of effective teaching learning process.
M2: To groom students for innovations, entrepreneurships and higher studies by providing appropriate platform.

Program Educational Objective (PEO)

PEO1: Graduate shall possess core competencies in the field of electrical engineering and have an ability to work in diversified environment.

PEO2: Graduate shall have an ability to provide smart sustainable solutions in electrical engineering adopting modern tools and technologies.

PEO3: Graduate shall have abilities of innovation, research & development to solve societal issues in the field of electrical engineering.

PSO: Program specific outcomes

PSO1: Able To Apply Professional Skill In Core Field Of Product, Service, Support Engineering And IT Professionals, Problem Solving Skills Like Data Interpretation ,Control System And Software Programming For Successful Employability
PSO2: To Develop The Professionals And Entrepreneurs In Renewable Energy System, Electrical Contracting And Consultancy, Digital Marketing Using Modern Tools And Techniques

PSO3: Able To Engage In Continuous Upgradation To Align with Recent Technology In Electrical Engineering And Peruse Higher Education

Class: SE

Course: Power Generation Technologies **Course Code:** 203141

After the completion of the course, students will be able to

CO201.1	Illustrate operations of thermal, nuclear, diesel and gas power plant with all accessories and cycles.
CO201.2	Identify the components of hydro power plant and solve simple numerical on turbine.
CO201.3	Interpretation of wind based energy generation along with its analysis and comparison
CO201.4	Apply the application of solar energy in thermal and electrical power generation.
CO201.5	Explain the operation of electrical energy generation using biomass, tidal, geothermal, hydel plants, fuel cell and interconnection with grid

Course: Engineering Mathematics-III **Course Code:** 207006

After the completion of the course, students will be able

CO202.1	Solve higher order linear differential equation using appropriate techniques for modelling and analyzing electrical circuits
CO202.2	Solve problems related to Laplace transform, Fourier transform, Z-Transform and applications to Signal processing and Control systems.
CO202.3	Perform vector differentiation and integration, analyze the vector fields and apply to Electro-Magnetic fields.
CO202.4	Analyze conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal processing.

Course: Material Science **Course Code: 203142**

After the completion of the course, students will be able

CO203.1	Categorize and classify different materials from Electrical Engineering applications point of view.
CO203.2	Explain and summarize various properties and characteristics of different classes of materials
CO203.3	Select the materials for application in various electrical equipment.
CO203.4	Explain and describe knowledge of nanotechnology, batteries and solar cell materials.
CO203.5	Test different classes of materials as per IS.

Course: Analog and Digital Electronics **Course Code:** 203143

After the completion of the course, students will be able to:

CO204.1	To apply various concepts of numbering systems & their conversion in analog & digital circuit applications. To select and use appropriate theories & techniques for reduction of Boolean expression.
CO204.2	Student will be able to have a conceptual knowledge of different types of logical circuits like flip flops, registers, counters, etc… and their applications to digital circuits.
CO204.3	Student will gain conceptual knowledge of op amp along with its configurations & its various applications in electronics circuits.
CO204.4	Students will be knowledgeable in different types of Transistors & amplifiers & amp; various types of diode rectifiers using R, RL & RC loads.

Course: Electrical Measurements and Instrumentation **Course Code:** 203144

After the completion of the course, students will be able

CO205.1	Understand various characteristic of measuring instruments, their classification and range extension technique.
CO205.2	Classify resistance ,apply measurement techniques for measurement of resistance and inductance.
CO205.3	Explain construction, working principle of dynamometer wattmeter and single phase energy meter.
CO205.4	Measurement of various electrical parameter using CRO and physical parameter using transducers.

Course: SOFT SKILLS **Course Code:** 203151

After the completion of the course, students will be able

CO206.1	Do SWOT analysis
CO206.2	Develop presentation and take part in group discussion
CO206.3	Understand and Implement etiquettes in workplace and in society at large.
CO206.4	Work in team with team spirit
CO206.5	Utilize the techniques for time management and stress management

Course: Power System I **Course Code:** 203145

After the completion of the course, students will be able

CO207.1	Recognize different patterns of load curve, calculate different factors associated with generating stations and to study tariff structure for LT and HT consumers
CO207.2	To identify various electrical equipment used in power station and to study different types of line insulators for overhead lines
CO207.3	To apply concept of sag and span for mechanical design of overhead lines and study underground cables
CO207.4	To analyze resistance and inductance of overhead transmission line
CO207.5	To compute G.M.R. and G.M.D. and capacitance of overhead lines..
CO207.6	To analyze performance of short and medium transmission line models

Course: Electrical Machines I **Course Code:** 203146

After the completion of the course, students will be able

CO208.1	To explain the construction and energy conversion principles of transformers and AC/ DC motors.
CO208.2	To develop the equivalent circuits of machines.
CO208.3	To evaluate the performance of electrical machines by actual experimenting.
CO208.4	To apply the fundamentals to select the machines for specific applications.

Course: Network Analysis **Course Code:** 203147

After the completion of the course, students will be able

CO209.1	Able to develop strong basics for electrical networks and problem solving by using modern tool and analyzing relevant technique for network in different conditions by application of theorems.
CO209.2	Estimate the performance of the networks and analyze the behavior of its transient response using modern tool ,classical method
CO209.3	Analyze the behavior of its transient response using Laplace transform approach
CO209.4	Implement network concept for analysis of 2-port networks and designing passive filters circuits .

Course: Numerical Methods and Computer Programming **Course Code:** 203148

After the completion of the course, students will be able

CO210.1	Develop algorithms and implement programs using C language for various numerical methods.
CO210.2	Demonstrate types of errors in computation and their causes of occurrence.
CO210.3	Identify various types of equations and apply appropriate numerical method to solve polynomial eq, transcendental eq, interpolation and numerical integration.
CO210.4	Apply and compare various numerical methods to solve first and second order ODE and solve linear simultaneous equations.

Course: Fundamentals of Microcontroller and Applications **Course Code:** 203149

After the completion of the course, students will be able

CO211.1	Illustrate about different types, working of Microcontroller - 8051, Internal architecture, along with Instruction set
CO211.2	Apply the programming skills to program the microcontroller in assembly language
CO211.3	Apply the concepts of timers , interrupts , serial communication of 8051 and programming using assembly language.
CO211.4	Analyze the real time problems and Design & develop interfacing circuits for various applications.

Class: TE

Course: Industrial and Technology Management **Course Code:** 311121

After the completion of the course, students will be able

CO301.1	Understand concepts of Technology management and Quality management.
CO 301.2	Explain importance of quality management and understand use of various assistance tools for quality improvement .
CO 301.3	Differentiate between marketing management and financial management and understand various theories of work motivation and group dynamics .
CO 301.4	Summarize intellectual property rights and understand concept of patent ,copy rights and trademarks .

Course: Advance Microcontroller and its Applications **Course Code:** 303141

After the completion of the course, students will be able

CO302.1	Illustrate architecture of PIC18F458 microcontroller, its instructions and the addressing modes.
CO302.2	Construct the program and debug in assembly language or C language for specific applications.
CO302.3	Use of an IDE for simulating the functionalities of PIC microcontroller and its use for software and hardware development.
CO302.4	Identify the Interfacing of microcontroller with various devices.
CO302.5	Determine the advance features of microcontroller peripherals in electrical system.

Course: Electrical Machines II **Course Code:** 303142

After the completion of the course, students will be able

CO303.1	Apply the knowledge and explain construction & working principle of three phase synchronous machines
CO303.2	Investigate the performance and estimate regulation of alternator by direct and indirect methods
CO303.3	Apply analyse and demonstrate operation of synchronous motor at constant load and variable excitation , constant excitation and variable load.
CO303.4	Explain working and applications of electrical machines.
CO303.5	Determine and explain analysis . test and performance of ac series motor
CO303.6	Calculate equivalent circuit parameters of single phase induction motor by performing no load & blocked rotor test

Course: Power Electronics **Course Code:** 303143

After the completion of the course, students will be able

CO304.1	Apply the fundamental principles of power electronic device like SCR and GTO and use them with their triggering circuit, protection circuit.
CO304.2	Describe construction and working principle of MOSFET, IGBT, MCT and To classify chopper circuits along with analysis
CO304.3	Analyze single Phase AC to DC converters and evaluate their performance
CO304.4	Analyze three Phase AC to DC converters and AC voltage regulators and evaluate their performance.
CO304.5	Analyze single Phase DC to AC inverters and evaluate their performance.
CO304.6	Analyze three Phase DC to AC inverters and evaluate their performance.

Course: Electrical Installation, Maintenance and Testing **Course Code:** 303144

After the completion of the course, students will be able

CO305.1	Classify distribution systems, its types and substations
CO305.2	Design of different earthing systems for residential and industrial premises
CO305.3	Select methods of condition monitoring and testing of various Electrical Equipments.
CO305.4	Estimate and Costing of residential and industrial premises.
CO305.5	Summarize the importance of electrical safety.

Course: Seminar and Technical Communication **Course Code:** 303145

After the completion of the course, students will be able

CO306.1	Relate with the current technologies and innovations in Electrical engineering.
CO306.2	Improve presentation and documentation skill.
CO306.3	Apply theoretical knowledge to actual industrial applications and research activity
CO306.4	Communicate effectively

Course: Power System II **Course Code:** 303146

After the completion of the course, students will be able

CO307.1	To explain the evaluation of ABCD constants and equivalent circuit parameters of Long transmission line
CO307.2	To evaluate the performance & to solve problems involving modeling design of HVDC & EHV-AC power transmission line.
CO307.3	To explain advantages of Per unit system & analyze power flow in power transmission networks.
CO307.4	To explain the calculation of currents & voltages in a faulted power system under both symmetrical & unsymmetrical faults .

Course: Control System I **Course Code:** 303147

After the completion of the course, students will be able

CO308.1	Develop mathematical equation and draw it's equivalent diagram to find transfer function of physical system.
CO308.2	Demonstrate time response of linear system.
CO308.3	Identify various types of methods to find stability of system in time domian & in frequency domain.
CO308.4	Design PID controller for LTI system .

Course: Utilization of Electrical Energy **Course Code:** 303148

After the completion of the course, students will be able

CO309.1	Able to understand principle of electric heating, welding, furnace and it's applications.
CO309.2	Aware about electrochemical process, electrical circuits and design simple residential illumination schemes
CO309.3	Apply knowledge of electric locomotive and calculate tractive efforts, power, acceleration and velocity of traction.
CO309.4	Get knowledge of electric braking methods, control of traction motors, train lighting and signaling system.

Course: Design of Electrical Machines **Course Code:** 303149

After the completion of the course, students will be able

CO310.1	Gain the knowledge of electrical machines with respect to heating and cooling curve
CO310.2	Apply various specifications of electrical machines as per IS-2026(part-I)
CO310.3	Design three phase Transformer .
CO310.4	Determine parameters and performance of three phase transformer.
CO310.5	Design three phase Induction motor by using modern tools.
CO310.6	Determine parameters and performance of three phase Induction motor.

Course: Energy Audit and Management **Course Code:** 303150

After the completion of the course, students will be able

CO311.1	Explain the present energy scenario with BEE energy policy and Electricity Act.
CO311.2	Elaborate the energy management roles and responsibilities with energy policies.
CO311.3	Understand the concept of demand management along with different tariffs.
CO311.4	Construct a model of energy audit of various sectors.
CO311.5	Generalize energy conservation and demand side measures for electrical, thermal and utility Systems.
CO311.6	Validate financial analysis of simple problems on cost benefit analysis.

Course: Electrical Workshop **Course Code:** 303151

After the completion of the course, students will be able

CO312.1	Integrate electrical/electronic circuits for useful applications
CO312.2	Acquire hardware skills to fabricate circuits designed
CO312.3	Read data manuals/data sheets of different items involved in the circuits
CO312.4	Test and debug circuits
CO312.5	Produce the results of the testing in the form of report

Class: BE

Course: Power System Operation and Control **Course Code: 403141**

After the completion of the course, students will be able

CO401.1	Analyze the dynamics of power system giving emphasis on stability study using equal area criteria and point by point method.
CO401.2	Identify the requirement of reactive power compensation and compensate reactive power using conventional and advanced controllers such as FACTs
CO401.3	Incorporate the automatic frequency and voltage control strategies for single and two area case and analyze the effects, knowing the necessity of generation control.
CO401.4	Formulate the unit commitment and economic load dispatch problem and solve it using optimization techniques. Analyze interchange of power between interconnected utilities considering reliability aspects of power system.

Course: PLC and SCADA Applications **Course Code: 403142**

After the completion of the course, students will be able

CO402.1	Illustrate with the concept of programmable logic controllers, generic PLC architecture, I/O modules of PLC
CO402.2	Analyze ladder logic for PLC application in an industry
CO402.3	Illustrate architecture of SCADA and explain importance of SCADA in critical infrastructure
CO402.4	Design software program using modern engineering tools and techniques for PLC and SCADA

Course: Elective-I Power Quality **Course Code: 403143**

After the completion of the course, students will be able

CO403.1	Elaborate the concept of power quality and identify power quality issues in Power system.
CO403.2	Determine the causes of voltage sag also estimate magnitude of voltage sag in power system.
CO403.3	List out the sources of transient over voltages and outline the various techniques for overvoltage protection and flickering mitigation techniques
CO403.4	Analyze the concept of harmonic distortion and list out the effect of harmonic distortion.
CO403.5	Estimate the harmonic analysis and evaluate total harmonic distortion also Estimate parameters for passive harmonic filter.
CO403.6	Elaborate the various power quality measurement devices with the guidelines in power system.

Course: Elective-II Restructuring and Deregulation **Course Code: 403144**

After the completion of the course, students will be able

CO404.1	Enlist the functions of various key entities in India and explain the implications of various policies and acts on restructuring and deregulation.
CO404.2	Evaluate the process of restructuring of power system
CO404.3	Classify various cost components in generation, transmission, distribution sector and tariff
CO404.4	Explain different power sector restructuring model .
CO404.5	Describe different types of electricity markets
CO404.6	Illustrate pricing and transmission rights of electricity along with fundamental concept of congestion management

Course: Control System II **Course Code: 403145**

After the completion of the course, students will be able

CO405.1	Describe the basic digital control system, sampling and reconstruction .
CO405.2	Express a system in the state space format.
CO405.3	Solve the state equation and familiarize with STM and its properties.
CO405.4	Design a control system using state space techniques including state feedback control and full order observer.

Course: Project I **Course Code: 403146**

After the completion of the course, students will be able

CO406.1	Design project for public health, safety, cultural, societal, environmental consideration applying engineering knowledge.
CO406.2	Inculcate the knowledge of project management, finance with communicating effectively on complex engineering activity with documentation, presentation and sharing instruction.
CO406.3	Engage in independent and lifelong learning by functioning effectively in teamwork along with professional ethics and team work
CO406.4	Analyse methods including design of hardware and using model tools for validation of hardware.

Course: Switchgear and Protection **Course Code: 403147**

After the completion of the course, students will be able

CO407.1	Describe the fundamentals of protective relaying and theory of arc interruption.
CO407.2	Categorize types of circuit breaker based on ratings.
CO407.3	Estimate the causes and effects of overvoltage due to lightning on protection.
CO407.4	Estimate the faults in transformer, alternator, 3 phase induction motor and its protection.

Course: Power Electronic Controlled Drives **Course Code: 403148**

After the completion of the course, students will be able

CO408.1	To Apply the basic concepts of drive and identify the importance of electrical drives in industries To solve the basic problems on motor –load dynamics and multi-quadrant operation
CO408.2	To Classify the various types of loads and their characteristics in the industries To Apply electric braking and its types, impart the practical knowledge by solving numerical
CO408.3	To explain the solid state scalar control methods of 3 phase induction motors
CO408.4	To explain the solid state vector control methods of 3 phase induction motor
CO408.5	To explain the solid state control methods of BLDC and Synchronous motors.
CO408.6	Identify classes and duty cycles of motor and applications of drives in industries

Course: Elective-III- HVDC and FACTS **Course Code: 403149**

After the completion of the course, students will be able

CO409.1	Compare HVDC and EHV AC systems for various aspects also explain HVDC circuit with chs.
CO409.2	Elaborate the layout of HVDC system with various components including protective devices
CO409.3	Determine the concept of VSC HVDC and conventional HVDC system
CO409.4	List out various types of Power Electronic Controllers like inverter and converter
CO409.5	Explain the concept of SVC AND STATCOM with operation details and characteristics
CO409.6	Understand the UPFC with details working operation and constraints.

Course: Elective-IV Smart Grid **Course Code: 403150**

After the completion of the course, students will be able

C410.1	Apply the knowledge to differentiate between Conventional and Smart Grid. the need of Smart Grid
C410.2	Illustrate the Smart storage and Hybrid Vehicles
C410.3	Classify the Smart metering, Home Automation, Smart Communication, and GIS.
C410.4	Explain the issues of micro grid.
C410.5	Solve the Power Quality problems in smart grid.
C410.6	Apply the communication technology in smart grid

Course: Project II **Course Code: 403151**

After the completion of the course, students will be able

C411.1	Design project for public health, safety, cultural, societal, environmental consideration applying engineering knowledge.
C411.2	Inculcate the knowledge of project management, finance with communicating effectively on complex engineering activity with documentation, presentation and sharing instruction.
C411.3	Engage in independent and lifelong learning by functioning effectively in teamwork along with professional ethics and team work
C411.4	Analyze methods including design of hardware and using model tools for validation of hardware.

Department of E&TC Engineering.

Department Vision Mission

Vision

"To be recognized as a centre for Human resource development in Electronics &Telecommunication engineering serving society".

Mission

1. To imbibe core and professional competencies in students by providing conducive academic environment.

2. To provide platform for innovations and entrepreneurship by undertaking real time problems.

3. To nurture an ethical and societal responsibilities amongst the learner for global environmental sustainability.

4. To promote students for higher studies by adapting cutting edge technology.

Program Educational Objective (PEO)

1. Shall have core technical competency to address the real world issues in the domain of Electronics and telecommunication engineering, receptive to emerging trends.
2. Shall have ability to develop sustainable solutions to satisfy diversified needs of the society.
3. Shall engage in lifelong learning with socio economic responsibilities in multi-disciplinary domain.

PSO: Program specific outcomes

1. To gain proficiency in designing the systems for tele-communication engineering applications.
2. To apply the knowledge of design and development to the Electronic systems based on VLSI and embedded technology**.**
3. To integrate automation of the processes with the support of hardware.
4. To develop software programs for simulation and implementation in the process of solving interdisciplinary engineering problems.

Class: SE

Course: Signals and Systems Course Code: 204181

After the completion of the course, students will be able

CO201.1	Analyze classification of systems with mathematical expressions and operate continuous and discrete time signals.
CO201.2	Formulate input output relationship for LTI systems and interpret system response with convolution.
CO201.3	Evaluate the signals in frequency domain using Fourier series and Fourier transform.
CO201.4	Compute Laplace transform and develop the ability analyze system by using properties
CO201.5	Define and understand the basic concept of probability, random variables, random signals and Calculate Correlation, CDF, PDF and probability of a given event.

Course: Electronics Devices & Circuits Course Code: 204182

After the completion of the course, students will be able

CO202.1	Interpret the behaviour of FET for DC & AC analysis.
CO202.2	Describe the need of biasing and operating point of MOSFET with the stability
CO202.3	Analyze small signal & low frequency model of MOSFET
CO202.4	Understand the features of electronics components by using MOSFET circuits.
CO202.5	Compare the performance parameters of amplifiers in presence with respect to positive and negative feedback.
CO202.6	Design linear regulated power supply and understands the working of switch mode power supply.

Course: Electrical Circuits & Machines (ECM) Course Code: 204183

After the completion of the course, students will be able

CO203.1	Analyze electrical circuits by using network theorems.
CO203.2	Design and analyze auto transformers and coupling transformers.
CO203.3	Understand the working principal of different electrical machines.
CO203.4	Select proper AC motor for given application.

CO203.5	Describe BLDC motor, Universal motor and Reluctance motor.
CO203.6	Describe applications of Stepper motors, Servo motors and Induction motors

Course: Data Structures & Algorithms Course Code: 204184

After the completion of the course, students will be able

CO204.1	Discuss the computational efficiency of the principal algorithms such as sorting & searching.
CO204.2	Write and understand the programs that use arrays &pointers in C
CO204.3	Describe how arrays, records, linked structures are represented in memory and use them in algorithms
CO204.4	Implement stacks & queues for various applications.
CO204.5	Understand various terminologies and traversals of trees and use them for various applications.
CO204.6	Understand various terminologies and traversals of graphs and use them for various applications.

Course: Digital Electronics Course Code: 204185

After the completion of the course, students will be able

CO205.1	Develop a system using combinational circuits to solve the various problems by applying knowledge of Boolean algebra.
CO205.2	Develop a system using sequential circuits to solve the various problems by applying knowledge of flip flop excitation table, registers and counters.
CO205.3	Demonstrate the concept of FSM and ASM through digital electronics application.
CO205.4	Analyze different types of digital logic families for effective design of electronic system.
CO205.5	Apply the knowledge of combinational and sequential logic design methods to model the complex digital circuits.
CO205.6	Describe the architecture and instruction set of 8051 microcontroller to develop a microcontroller based system for simple engineering applications.

Course: Electronic Measuring Instruments & Tools Course Code: 204186

After the completion of the course, students will be able

CO206.1	**Describe** the fundamentals of electrical measuring instruments with specifications, features and capabilities of electronic instruments.
CO206.2	**Exemplify** an instrument for given measurements.
CO206.3	**Illustrate** the required measurements using various instrument setups.
CO206.4	**Analyze** the appropriate instrument for interpret the measurement of electrical parameters professionally.

Course: Course Code: Engg. Maths –III Course Code: 207005

After the completion of the course, students will be able

CO208.1	Apply higher order linear differential equations to model and solving LCR circuit problems.
CO208.2	Solve problems related to Fourier transform, Z-transform and applications to Communication systems and Signal processing.
CO208.3	Determine Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing.
CO208.4	Solve vector differentiation problems, analyze the vector fields
CO208.5	Apply the theorems for vector integral calculus problems and Electro-Magnetic fields.
CO208.6	Determine conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal processing.

Course: Integrated Circuits Course Code: (204187)

After the completion of the course, students will be able

CO209.1	Describe basic building blocks of op-amp with performance parameters and closed loop configurations.
CO 209.2	Analyze linear and non linear applications of OPAMP.
CO 209.3	Compare OPAMP based convertors.
CO 209.4	Elaborate Phase Locked Loop and Oscillator with its applications
CO 209.5	Design Active Filter using OPAMP.

Course: Course Code: Object Oriented Programming Course Code: 204184

After the completion of the course, students will be able

CO210.1	Describe the principles of object oriented programming.
CO210.2	Apply the concepts of data encapsulation, inheritance in C++
CO210.3	Understand basic program constructs in Java
CO210.4	Apply the concepts of classes, methods and inheritance to write programs Java
CO210.5	Use arrays, vectors and strings concepts and interfaces to write programs in Java
CO210.6	Describe and use the concepts in Java to develop user friendly program

Course: Control System Course Code: 204188

After the completion of the course, students will be able

CO209.1	Determine physical system in suitable form for analysis of control system.
CO209.2	Understand the stability of a closed-loop control system.
CO209.3	Apply time domain parameters for control systems analysis.
CO209.4	Inspect control systems stability in frequency domain.
CO209.5	Express system equations in state variable form.
CO209.6	Introduce controllers and digital control system.

Course: Course Code: Analog Communication Course Code: (204189)

After the completion of the course, students will be able

CO311.1	Analyze generation and transmission of AM signals with it's spectrum & Power.
CO311.2	Distinguish AM receivers with performance characteristics and demodulation methods.
CO311.3	Illustrate Frequency and phase modulation for differentiating Narrow band & Wide band signals.
CO311.4	Contrast FM receivers with detection techniques.
CO311.5	Evaluate noise parameters for analog communication system in presence of noise.
CO311.6	Express pulse modulation techniques the help of sampling theorem.

Class: TE

Course: Digital Communication Course Code: 304181

After the completion of the course, students will be able

CO301.1	Demonstrate the use of source encoding methods for audio signal transmission
CO 301.2	Identify the need of channel blocks for transmission of digital data
CO 301.3	Interpret the impact of random noise in digital communication system
CO 301.4	Selection of baseband receivers based on signal to noise ratio and bit error probability
CO 301.5	Distinguish between pass band receivers based on bandwidth and symbol rate
CO 301.6	Illustrate the use of spread spectrum technology for digital communication system

Course: Digital Signal Processing Course Code: 304182

After the completion of the course, students will be able

CO302.1	Identify concept of sampling and orthogonality and mapping between analog to digital domain.
CO302.2	Carryout DT signal and system using DFT and its significance and problem related to computational complexity.
CO302.3	Test DTLTI system using Z transform by applying its properties.
CO302.4	Construct digital IIR filter for given filter specifications.
CO302.5	Design digital FIR filter to meet specific magnitude and linear phase requirements.
CO302.6	Discuss different DSP applications.

Course: Electromagnetics Course Code:304183

After the completion of the course, students will be able

CO303.1	Use the vector calculus to analyze electrostatic and Magnetostatic field and adapt laws for its applications
CO303.2	Compute the value of capacitance using electrostatic boundary conditions.
CO303.3	Utilize Maxwell's equations and electromagnetic wave theory to solve different electromagnetic problems.
CO303.4	Express the transmission line parameters to construct its equations for professional engineering solution

Course: Course Code: Microcontrollers Course Code: 304184

After the completion of the course, students will be able

CO304.1	Explain the architecture, features, peripheral support & instruction set of 8051 microcontroller.
CO304.2	Interpret Input Output port interfacing & programming environment of 8051 microcontroller.
CO304.3	Simulate small embedded application for 8051 microcontroller using assembly language programming.
CO304.4	Understand the architecture, features, peripheral support & instruction set of PIC microcontroller.
CO304.5	Describe port structure; interrupt structure & interacting of PIC microcontroller.
CO304.6	Simulate small embedded application for PIC microcontroller using embedded C.

Course: Mechatronics Course Code: 304185

After the completion of the course, students will be able

CO305.1	Understand and identify basic elements of mechatronics systemand its symbolization used in block diagram.
CO305.2	Categorize different types of sensors and transducers as per need of application.
CO305.3	Recognize Hydraulic actuators.
CO305.4	Recognize Pneumatic of actuators
CO305.5	Recognize Electric, Electro-mechanical actuators
CO305.6	Apply use of mechatronics elements in real-life problem solving.

Course: Course Code: Embedded Systems Design Course Code: 304193

After the completion of the course, students will be able

CO306.1	Design an electronics system, SMPS by applying the fundamental concepts and its working principles.
CO306.2	Interpret datasheets and thus select appropriate components and devices for designing electronics system/prototype of system.
CO306.3	Use an EDA tool for circuit schematic and simulation.
CO306.4	Organize reports for the consumption, inventory, Purchases of material for design of electronics system.
CO306.5	Create the database and query handling using suitable tools.

Course: Power Electronics **Course Code: 304186**

After the completion of the course, students will be able

CO307.1	Understand the construction and working of power devices with their gate driving circuits.
CO307.2	Analyze types of single phase & three phase controlled rectifiers (AC to DC Converters).
CO307.3	Illustrate single phase & three phase controlled Inverters (DC to AC Converters).
CO307.4	Examine the types of choppers & AC voltage controller.
CO307.5	Distinguish resonant converters & protection circuits.
CO307.6	Infer the types of UPS and different motor drives.

Course: Course Code: ITCCN Course Code: 304187

After the completion of the course, students will be able

CO308.1	Perform information theoretic analysis of communication system specifically for data compression by means of source coding techniques.
CO308.2	Evaluate channel coding techniques for error detection and correction in communication system and computer network.
CO308.3	Design cyclic codes and encoder-decoder circuits by understanding the Galois field arithmetic.
CO308.4	Comprehend fundamental principles of data communication and networking.
CO308.5	Understand the flow and error control techniques in communication network.

Course: Business Management **Course Code: 304188**

After the completion of the course, students will be able

CO309.1	Describe fundamentals of Management thoughts, vital for understanding the conceptual frame work of Management as a discipline.
CO309.2	Evaluating quality assessment tools for project development including analysis of impact of finance factors.
CO309.3	Recognize the development, impact of manpower on internal and external environment to promote entrepreneurship.
CO309.4	Understanding & identifying appropriate modern marketing systems & the terms used therein including supply chain management.

Course: Advanced Processor Course Code: 304193

After the completion of the course, students will be able

CO310.1	Relate the ARM microprocessor architecture & DSP architecture to recognize its applications.
CO310.2	Utilize advanced peripherals to interface with ARM based microcontrollers
CO310.3	Develop an Embedded System to solve real time problems.
CO310.4	Make use of DSP Processors and resources for signal processing.

Course: Course Code: System Programming and Operating System Course Code: 304190

After the completion of the course, students will be able

CO311.1	Utilize the components of system software for implementation of assembler and macro processor
CO311.2	Understand system software concepts as linker, loader and compilers
CO311.3	Classify the Operating Systems with the knowledge of its fundamentals.
CO311.4	Infer concurrency controls in OS
CO311.5	Evaluate different memory management schemes
CO311.6	Illustrate the IO and file management policies.

Class: BE

Course: Course Code: VLSI Design and Technology Course Code: 404181

After the completion of the course, students will be able

CO401.1	**Implement** digital system design modules using VHDL coding & write VHDL coding for combinational and Sequential logic to discriminate these two types.
CO401.2	**Focus** design issues like meta stability, noise margin fan out and timing to find adequacy of Efficient VHDL Modeling**.**
CO401.3	**Differentiate** the development of the custom IC using EDA tool for the implementation of reconfigurable computing system using FPGA/CPLD.
CO401.4	**Design** digital CMOS circuit to estimate chip area , power & speed.
CO401.5	**Analyze** issues & constraints in ASIC Design
CO401.6	**Apply** testing methodology in digital design and built self test circuit.

Course: Computer Networks & Security Course Code: 404182

After the completion of the course, students will be able

CO402.1	Understand MAC protocols and basic principles of wired & wireless LANs.
CO402.2	Describe and analyze the Network layer services and its performance, IP protocol, IP Packet forwarding techniques, IPv4 and Mobile IP.
CO402.3	Summarize unicast & multicast network routing algorithms and explain IGMP & IPv6 protocols.
CO402.4	Compare transport layer protocols and evaluate their performance.
CO402.5	Explain the concept of C-S Model for HTTP, DNS, FTP, DHCP, Email and Telnet using Windows XP/2003 Server systems applications.
CO402.6	Discuss the concept cryptography and elaborate network & internet security.

Course: Radiation and Microwave Techniques Course Code: 404183

After the completion of the course, students will be able

CO403.1	Explain different terminologies of radiating elements to analyze various performance parameters.
CO403.2	Analyze different antenna to evaluate array factor for antenna array.
CO403.3	Implement different modes of transmission lines during the wave propagation.
CO403.4	Design microwave communication network by using passive microwave components.
CO403.5	Generate the electromagnetic waves with the help of microwave tubes and solid state devices.
CO403.6	Measurements for different microwave parameters of microwave test bench.

Course: Embedded Systems & RTOS **Course Code: 404184**

After the completion of the course, students will be able

CO404.1	To Interpret the Embedded system design metrics for developing real time applications to bout recent trends in Industry.
CO404.2	To Understand real time operating system & GPOS concept and verify its services
CO404.3	To Summarize UCOS-II RTOS and its services
CO404.4	To Exemplify modern microcontroller architecture for Real-world interfacing
CO404.5	To Explain the Embedded Linux Environment for Linux Kernel Construction and device driver's development.
CO404.6	To learn open source platform for embedded system development.

Course: Electronic Product Design **Course Code: 404185**

After the completion of the course, students will be able

CO405.1	Illustrate the stages of product design aspects.
CO405.2	Identify the basic requirements for hardware design & testing methods.
CO405.3	Use the appropriate software platform for the testing & real time Programming.
CO405.4	Understand the PCB design techniques.
CO405.5	Test & debug the designed product**.**
CO405.6	Recognize the importance of Preparation, Presentation, and Preservation of documents.

Course: Mobile Communication **Course Code: 404189**

After the completion of the course, students will be able

CO406.1	Illustrate switching techniques for voice and data traffic
CO406.2	Evaluate the performance parameters in traffic engineering.
CO406.3	Demonstrate basic concepts of cellular network & propagation mechanism.
CO406.4	Interpret GSM network and its applications.
CO406.5	Infer data transmission in GSM & its services.
CO406.6	Understand evolution of GSM & CDMA technologies

Course: Broadband Communication System Course Code: 404190

After the completion of the course, students will be able

CO407.1	Describe the primary components fiber optical communication systems.
CO407.2	Design Link power budget and Rise Time Budget by proper selection of components and check its viability.
CO407.3	Understand the role of WDM components in advanced fiber optical communication systems.
CO407.4	Analyze various launching techniques and orbital mechanisms to get communication system as per engineering norms
CO407.5	Identify various satellite subsystems to meet the socio economic challenges
CO407.6	Design and analyze satellite link for sustainable satellite communication

Course: Audio Video Engineering Course Code: 404191

After the completion of the course, students will be able

CO408.1	Understand the concept of colour Television along with standards.
CO408.2	Describe the digital TV, Digital Video compression techniques and LCD, LED display devices.
CO408.3	Analyze advanced television systems - HDTV,IPTV, mobile TV, Wi-Fi TV,3D TV and Digital broadcasting.
CO408.4	Interpret audio recording systems and Acoustics principles.

Course: Course Code: Wireless Sensor Network Course Code: 404189

After the completion of the course, students will be able

CO409.1	**Understand** Concepts and Terminologies in Wireless Sensor Network.
CO409.2	**Express** the use of Radio Communication and importance of Link Management in WSN
CO409.3	**Illustrate** the wireless Standards and Protocols associated with Wireless Sensor Network
CO409.4	**Recognize** importance of Localization concept and Apply Routing Techniques used in WSN
CO409.5	**Analyze** techniques of Data Aggregation and importance of security in Wireless Sensor Network
CO409.6	**Examine** the issues involved in design and deployment of Wireless Sensor Network

Course: Course Code: PLCA Course Code: 404191

After the completion of the course, students will be able

CO410.1	Analyze the type of control system for their selection in process industry.
CO410.2	Design a signal conditioning circuit as per the sensor interface requirement.
CO410.3	Identify and justify the need of various controller modes and actuators for applications in multi-disciplinary process and environment.
CO410.4	Interpret PLC architectures and modern communication technology for various industrial systems by comparing them.
CO410.5	Implement a SCADA and HMI system for automation applications.
CO410.6	Understand CNC Machine tools and process.

Department of Information Technology

Vision

"To develop competent IT professionals for e-development of emerging societal needs."

Mission

M1. Educating aspirants to fulfill technological and social needs through effective teaching learning process.

M2. Imparting IT skills to develop innovative solutions catering needs of multidisciplinary domain.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Nurture Information technology resource who will work for diversified needs of Academia, industry, and research.

PEO2: Inculcate problem-solving skills using IT tools to solve socio-economic problems ethically.

PEO3: Instill qualities of leadership, innovation, and entrepreneurship with effective communication skills, teamwork and create the ability for life-long learning.

PROGRAMME SPECIFIC OUTCOMES

1	Solve problems in areas like Software Design and Development, Computer Architectures and Operating System, web systems, Computer Networks and Database Management Systems to address critical challenges in the field of IT.
2	Apply skills in Design and Development of Software systems, Operating System, Database Management, Computer networks and Web Technologies.
3	Exhibit active participation in multidisciplinary applications.

COURSE OUTCOMES

SEMESTER I

Subject Code	Subject	Course Outcomes (COs) statement
Second Year- Information Technology		
214441	Discrete Structures	1. Calculate number of possible outcomes using permutation and combination 2. Explain concept of sets & proposition and apply it to solve real time problems 3. Describe and analyze relation and functions 4. Construct different types of trees and graphs and apply them to solve real world problems 5. Analyze the properties of groups and rings
214442	Computer Organization and Architecture	1. Able to analyze the performance of computer based upon the various metrics and solve problems based on computer arithmetic 2. Able to identify the fields of instruction and explain processor structure & its functions 3. Analyze and design the multiplier CU based upon the control unit design methods and Obtain knowledge about microprogramming of a processor. 4. Able to identify the memory types and Understand concepts related to memory & IO organizations 5. Able to analyze instruction level parallelism in MIPS system and acquire knowledge about parallel organization of multiprocessors & multi core systems.
214443	Digital Electronics and Logic Design	1. Demonstrate knowledge of number system, Boolean algebra, TTL and CMOS logic 2. Build different combinational circuit by using reduction techniques.

		3. Examine Sequential circuits viz. Flip-Flops, Counter and their applications. 4. Implement sequence generators by using registers 5. Design different Programmable Logic Devices (PLD) by using SOP. 6. Implement VHDL Programming by using different modeling styles.
214444	Fundamentals of Data Structures	1. Apply appropriate constructs of C language and coding standards to design various applications. 2. Develop various applications using dynamic memory allocation and file handling concepts. 3. Analyze the algorithms with respect to time and space complexity. 4. Develop various applications using appropriate searching and /or sorting techniques and analyze time and space complexity of searching and sorting techniques. 5. Design and implement program and solve problem using appropriate data structures and algorithms.
214445	Problem Solving and Object Oriented Programming	1. Able to apply programming skills and problem solving concepts to solve problems using computers. 2. Able to Design solution for real time problem using logic structures and object oriented programming. 3. Able to develop object oriented programming and problem solving skills using OOP concepts. 4. To apply tools and best practices in object –oriented programming.

Third Year- Information Technology		
314441	Theory Of Computation	1. Able to Design Finite State Machine with and without output for a given problem. 2. Able to Construct Regular Expression for a given formal language. 3. Able to Identify Context Free Grammar and apply grammar rules for syntax analysis. 4. Able to Design Pushdown Automata, Post Machine and Turing machine for a given formal language. 5. Able to Interpret the problems of decidability, reducibility and time complexity.
314442	Database Management Systems	1. Describe the basic functionality of RDBMS and analyze database model for a sample system. 2. Design a database and implement a database schema for a given problem domain using SQL commands and transaction processing. 3. Describe the concept of concurrency control for transactions and use of recovery processes. Also describe various database architectures. 4. Analyze the impact of big data on the information industry using data services like XML, Hadoop, JSON, and MongoDB. 5. Describe the concept of data warehousing and data mining.
314443	Software engineering & Project Management	1. To analyze and apply appropriate lifecycle model of software development 2. To identify software requirements by applying various modeling techniques. 3. To apply project planning and scheduling techniques in given project management task 4. To understand principles of agile development, SCRUM process and analyze agile process model from other

		process models. 5. To apply various software tools and techniques for project monitoring and control with risk and quality management. 6. To practice current and future trends of IT industry in software engineering and project management.
314444	Operating System	1. Describe the concept of Operating system and Implement Shell programming as well as kernel programming. 2. To apply the concept of process, thread and Implement Process management System call. 3. To implement Classical Synchronization Problems and describe the concept of memory management. 4. To apply the concept of Disk scheduling and Implement File Handling System Calls.
314445	Human-Computer Interaction	1. To explain importance of HCI study and principles of user-centered design (UCD) approach. 2. To develop understanding of human factors in HCI design. 3. To develop understanding of models, paradigms and context of interactions. 4. To design effective user-interfaces following a structured and organized UCD process. 5. To evaluate usability of a user-interface design. 6. To apply cognitive models for predicting human-computer-interactions.

314449	Audit Course 3 Professional Ethics and Etiquettes	1. To summarize the principles of proper courtesy as they are practiced in the workplace. 2. To describe ways to apply proper courtesy in different professional situations. 3. To practice appropriate etiquettes in the working environment and day to day life. 4. To learn and build proper practices for global corporate world.
314449	Audit Course 3 Digital & Social Media Marketing	1. Develop a far deeper understanding of the changing digital landscape. 2. Identify some of the latest digital marketing trends and skill sets needed for today's marketer. 3. Successful planning, prediction, and management of digital marketing campaigns. 4. Implement smart management of different digital assets for marketing needs. 5. Assess digital marketing as a long term career opportunity.
Fourth Year- Information Technology		
414453	Information and Cyber Security	1. Design and implement the solution to the complex engineering problem of Information and Cyber using Number theory. 2. Able to analyze, implement various security algorithm and Develop analytical competency to identify the solutions to various security principles 3. Able to identify risk analysis for information security. 4. To identify need of Cyber Security and cyber crime techniques to state Laws that govern cyber crime.

414454	Machine Learning and Applications	1. Explain the concept of machine learning 2. Apply classification methods to measure performance and accuracy 3. Apply regression methods to measure performance and accuracy and discuss the concept of theory of generalization 4. Demonstrate logic based ,algebraic ,probabilistic model 5. To describe trends in machine learning
414455	Software Design and Modelling	1. Define and understand object oriented methodologies, basics of Unified Modeling Language (UML). 2. Analysis of Object oriented process, use case modeling, domain/class, Interaction and Behavior modeling 3. Discuss and design process of business, access and view layer of class design 4. Compute study of GRASP principles and GoF design patterns 5. Study of architectural design principles and guidelines in the various type of application development.
414456	Elective-I	1. To Comprehend the Information Systems and development approaches of intelligent system 2. To Evaluate and rethink business processes using information systems. 3. To Propose the Framework for business intelligence. 4. To Get acquainted with the Theories, techniques, and considerations for capturing organizational intelligence 5. To align business intelligence with business strategy. 6. To apply the techniques for implementing business intelligence systems.
414457	Elective-II	1. Describe software testing process and to illustrate the role of software tester in software development process. 2. Investigate the scenario and to select the proper testing technique to test the software 3. Explore the test automation concepts and tools and

		estimation of cost, schedule based on standard metrics. 4. Choose appropriate quality assurance models and develop quality. 5. Describe different software quality assurance trends.
414460	Project Phase-I	1. Student should be able implement their ideas/real time industrial problem/ current applications from their engineering domain. 2. Students should be able to develop plans with help of team members to achieve the project's goals. 3. Student should be able to break work down into tasks and determine appropriate procedures. 4. Student should be able to estimate and cost the human and physical resources required, and make plans to obtain the necessary resources. 5. Student should be able allocate roles with clear lines of responsibility and accountability and learn team work ethics. 6. Student should be able to apply communication skills to effectively promote ideas, goals or products.
414461	Audit Course V Green Computing	1. Understand the concept of green IT and relate it to sustainable development. 2. Apply the green computing practices to save energy. 3. Discuss how the choice of hardware and software can facilitate a more sustainable operation. 4. Use methods and tools to measure energy consumption.
414461	Audit Course V Statistical Learning Model using R	1. Students will be familiar with concepts related to “data science”, ”analytics”, “machine learning”, etc. These are important topics, and will enable students to embark on highly rewarding careers. 2. Students will capable of learning “big data” concepts on their own

SEMESTER II

Subject Code	Subject	Course Outcomes (COs) statement
Second Year- Information Technology		
207003	Engineering Mathematics -III	1. Solve higher order linear differential equation using appropriate techniques for analyzing electrical circuits. 2. Solve problems related to Fourier transform, Z-Transform and applications to Signal and Image processing. 3. Apply statistical methods like correlation, regression analysis and probability theory for analysis and prediction of a given data. 4. Perform vector differentiation and integration to analyze the vector fields. 5. Analyze conformal mappings, transformations and perform contour integration of complex functions required in Image processing, Digital filters and Computer graphics.
214450	Computer Graphics	1. Demonstrate concept of geometric, mathematical and algorithmic concepts necessary for computer graphics. 2. Apply 2D and 3D Graphical transformation on basic geometric primitives. 3. Apply segments, windowing and clipping algorithm for given input polygon. 4. Design and develop graphics applications using modern tools in shading, animation and gaming. 5. Apply mathematical function in generation of curves and fractals.

214451	Processor Architecture and Interfacing	1. Acquire knowledge about architectural details of 80386 microprocessor 2. Understand memory management and multitasking of 80386 microprocessor. 3. Understand architecture and memory organization of 8051 microcontroller. 4. Explain timers and interrupts of 8051 microcontroller and its interfacing with I/O devices.
214452	Data structures and Files	1. Understand Abstract Data Type (ADT) for linear data structures like stack and queue and their implementations. 2. Analyze and implement non-linear data structures like tree and graph and their applications using C++. 3. Understand and apply the concept of tables to database. 4. Apply advanced tree algorithms to solve problems. 5. Implement different file organizations.
214453	Foundations of Communication and Computer Network	1. Recognize data/signal transmission over communication media. 2. Distinguish between usages of various modulation techniques in Communication. 3. Explain error correction and detection techniques and flow control protocols. 4. Analyze various spread spectrum and multiplexing techniques. 5. Acquaint with transmission media and their standards.
Third Year- Information Technology		
314450	Computer Network Technology	1. Classify the routing protocols and analyses how to assign the IP addresses for the given network 2. To implement a network protocol based on socket programming

		3. Configure servers by demonstrating different servers with their applications. Describe different wireless technologies and IEEE standards. 4. Analyze Routing Protocols for Ad-hoc Wireless Networks and Implement wireless sensor network. 5. To develop applications on emerging trends in communication networks
314451	System Programming	1. Able to analyze assembly scheme, different loading schemes, design and implement system programs such as assembler, macro processor. 2. Able to design and implement lexical analyzer, and use tool LEX for generation of Lexical Analyzer. 3. Able to study role of parsers and use tool YACC for generation of Syntax Analyzer. 4. Able to study storage allocation, code generation and code optimization issues assessed and applied accordingly.
314452	Design And Analysis of Algorithms	1. To apply proof techniques to prove correctness of problem and to calculate computational complexity for algorithms using asymptotic notations also solve recurrence relations. 2. To apply Divide & Conquer, Greedy and Dynamic programming approach to design and analyze algorithms. 3. To illustrate problems using Backtracking algorithmic strategy. 4. To compare approaches for Branch and Bound strategy 5. To explore the concept of P, NP, NP-complete, NP-Hard and parallel algorithms.

314453	Cloud Computing	1. To describe the need of Cloud based solutions. 2. To explain concept of virtualization and common standards used in implementation of cloud computing. 3. To explain effective techniques to program Cloud Systems. 4. To describe Security Mechanisms and issues in Cloud Applications. 5. To discuss use of ubiquitous clouds in applications of Internet of Things. 6. To explain emerging trends in cloud computing.
314454	Data Science & Big Data Analytics	1. To understand Big Data primitives 2. To learn and apply different mathematical models for Big Data. 3. To understand the different Big data processing technologies. 4. To analyze each learning To understand needs, challenges and techniques for big data visualization. model come from a different algorithmic approach and it will perform differently under different datasets. 5. To learn different programming platforms for big data analytics.
314458	Project Based Seminar	1. To Gather, organize, summarize and interpret technical literature with the purpose of formulating a project proposal. 2. To write a technical report summarizing state-of-the-art on an identified topic. 3. Present the study using graphics and multimedia presentations. 4. Define intended future work based on the technical

		review. 5. To explore and enhance the use of various presentation tools and techniques. 6. To understand scientific approach for literature survey and paper writing.
314449	Audit Course 4 Social Awareness and Governance Program	1. Understand social issues and responsibilities as member of society. 2. Apply social values and ethics in decision making at social or organizational level 3. Promote obstacles in national integration and role of youth for National Integration 4. Demonstrate basic features of Indian Constitution.
		5.
414462	Distributed Computing System	1. Apply the principles of distributed systems to develop new applications. 2. Develop the interface between different distributed applications using message passing communication techniques. 3. Analyze different Synchronization and Election techniques used in distributed system 4. Analyze different security issues in distributed and multimedia systems
414463	Ubiquitous Computing	1. Demonstrate the knowledge of design of Ubicomp and its applications. 2. Explain smart devices and services used by Ubicomp Systems. 3. Describe the significance of actuators and controllers in real time application design. 4. Explain the concept of HCI in the design of automation applications.

		5. Explain taxonomy of Ubicomp privacy and ways of addressing Ubicomp privacy. 6. Describe Ubicomp communication and management.
414464	Elective III	1. Explain what is internet of things. 2. Explain architecture and design of IoT. 3. Describe the objects connected in IoT. 4. Understand the underlying Technologies. 5. Understand the platforms in IoT. 6. Understand cloud interface to IoT.
414465	Elective IV	1. To understand rural development and rural economy of India. 2. To identify different measures and paradigms of rural development 3. To Understand and learn importance of technologies in rural development and use of ICT 4. To learn different measures of community development 5. To learn different forms of rural entrepreneurship. 6. To understand challenges and opportunities in rural development by learning different case studies.
414468	Project Work	1. Learn teamwork. 2. Be well aware about Implementation phase. 3. Get exposure of various types of testing methods and tools. 4. Understand the importance of documentation.
414469	Audit Course- VI	1. Expand your knowledge of Internet of Things. 2. Discover how you can use IoT in your Engineering applications. 3. Build more effective hands on with IoT elements. 4. Expand the practical knowledge of using IoT components like sensors, processors. 5. Expand the understanding of using different protocols.

Department of Mechanical Engineering.

Vision

"To be recognized globally as a center of quality education and research for aspiring mechanical engineer to cater the ever changing demands of industry and society."

Mission

M1. To develop responsible mechanical engineers with strong technical skills to meet the needs of the profession and society.

M2. To develop problem solving and research ability in students to meet needs of demanding challenges of society and other interdisciplinary areas.

M3. To inculcate moral values, leadership and professional skills for a long productive and influencing professional career.

Program Educational Objectives (PEOs)

1. The graduates will have a successful career in mechanical engineering with strong **technical, research & professional skills**.
2. The graduates will possess an ability to work in diversified fields along with **team work and leadership qualities**.
3. The graduates will continue **to learn** and **to adapt** in a society of constantly evolving technological environment.

Program Specific Objectives (PSOs)

1.0 Specify, **design** and evaluate mechanical components and systems using modeling and analysis software.

2.0 **Apply** knowledge of machines, tools, automation, properties of advanced materials and modern management methods for manufacturing of mechanical components and systems.

3.0 **Apply** core aspects of thermal and fluid engineering to **determine** the performance of mechanical systems including power absorbing and power generating systems.

Class: SE

Course: EM-II **Course Code: C201**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	At the end of this course, students will be able to:1) Solve higher order linear differential equations and apply to modelling and analyzing mass spring systems.
CO2	Apply Laplace transform and Fourier transform techniques to solve differential equations involved in Vibration theory, Heat transfer and related engineering applications.
CO3	Apply statistical methods like correlation, regression analysis in analyzing, interpreting experimental data and probability theory in testing and quality control.
CO4	Perform vector differentiation for the vector fields and apply to fluid flow problems.
CO5	Perform vector integration for finding areas, surface areas and volumes of different objects.
CO6	Solve various partial differential equations such as wave equation, one and two dimensional heat flow equations.

Course: MP-I **Course Code: C202**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Describe Principles of sand casting Processes and special casting processes with their Advantages, Limitations and Applications.
CO2	Explain & Relate given process parameters and their effects on hot & cold working of Metals.
CO3	Describe process parameters and equipment for plastic manufacturing processes and their significance.
CO4	Explain metal joining processes with respect to material Properties and applications.
CO5	Describe components of press tool and design sheet layout, force calculation, power for cutting sheet metals.
CO6	Explain the basic principles, operations performed on the lathe machine and calculating parameters encountered in machining operations.

Course: CAMD **Course Code: C203**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Understand the importance of CAD in the light of allied technologies such as CAM, CAE, FEA, CFD, PLM.
CO2	Understand the significance of parametric technology and its application in 2D sketching.
CO3	Understand the significance of parametric feature-based modeling and its application in 3D machine components modeling.
CO4	Ability to create 3D assemblies that represent static or dynamic Mechanical Systems.
CO5	Ability to ensure manufacturability and proper assembly of components and assemblies.
CO6	Ability to communicate between Design and Manufacturing using 2D drawings.

Course: THERMO **Course Code: C204**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Apply fundamentals of thermodynamics, laws of thermodynamics, SFEE, concept of irreversibility to real systems.
CO2	Explain ideal gas processes to estimate heat, work and change in internal energy, enthalpy & study principle of entropy.
CO3	Estimate performance of various thermodynamic gas power cycles, gas refrigeration cycle & study the principle of availability.
CO4	Determine the performance of vapor power cycle, vapor refrigeration cycle by studying properties of steam for calculating work and heat transfer during phase change process.
CO5	Explain classification, working of boiler to determine the performance of steam generators & estimate height of chimney for natural draught in boiler plants.
CO6	Determine various properties of moist air and analysis of psychrometric processes using psychrometric charts to achieve human comfort.

Course: MS **Course Code: C205**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Discuss the basic concept of Crystal systems and detailed morphology of metals and materials.
CO2	Classify the crystal imperfections in solids to understand the deformation mechanisms in materials - slip, twinning mechanism.
CO3	Identify the suitable Destructive/ Nondestructive testing method for materials used in Industrial applications.
CO4	Explain Corrosion, its classification and its prevention methods in detail for enhancing the metal life in industrial applications.
CO5	Classify surface modification methods used in industrial applications.
CO6	Discuss the basic concept of Powder Metallurgy process and Identify the suitable manufacturing technique for special purpose products through powder metallurgy technique.

Course: SOM **Course Code: C206**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Calculate simple stress and strain for determinate, indeterminate, homogeneous and composite bars under uniaxial or multiaxial loading.
CO2	Draw shear force diagram and bending moment diagram for beam with given loading conditions to locate point of contraflexure or contra shear.
CO3	Determine bending and shear stresses for beam with given loading conditions to show bending and shear stress distribution in beam section.
CO4	Calculate maximum slope and deflection for beam with given loading conditions; determine strain energy due to axial loading, bending and torsion.
CO5	Compute torsional shear stresses, deformations in determinate and indeterminate shafts subjected to twisting moment using torsion equation; determine critical load for columns using Euler or Rankine formula.
CO6	Determine principal stresses, strains and planes under combined bending and shear loading using analytical and Mohr’s circle method with application of theories of elastic failure.

Course: FM **Course Code: C207**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Identify types of fluid flow and calculate velocity, acceleration, stream function and velocity potential at any point in fluid flow.
CO2	Calculate pressure drop, rate of flow in a close conduit using Bernoullis and continuity equations.
CO3	Determine velocity, shear stress and frictional pressure drop in a laminar flow between two parallel plates and in a pipe using derived equations.
CO4	Compute major and minor losses in a pipe network using Darcy Weisbatch and empirical equations.
CO5	Construct mathematical correlation for complex flow phenomenon in terms of dimensionless parameters.
CO6	Determine boundary layer thicknesses drag and lift for air flow over thin flat plate, cylinder, sphere and airfoil shapes.
CO7	Determine viscosity, surface tension, compressibility and capillary rise or fall of liquid for temperature encountered in fluid engineering problems.
CO8	Determine total pressure, center of pressure on plane and curved surfaces encountered in dam structures, and metacentric height of floating & submerged body in a static fluid.

Course: Soft Skills **Course Code: C208**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Improve communication, interaction and presentation of ideas.
CO2	Right attitudinal and behavioural change
CO3	Developed right-attitudinal and behavioral change
-	-
-	-
-	-

Course: TOM-I **Course Code: C209**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Demonstrate the working of planar mechanisms to be used in automobiles and machine tools.
CO2	Determine the mass moment of inertia of rigid bodies having symmetric and complex shape used in automobiles and machine tools.
CO3	Determine static and dynamic forces on components of slider crank mechanism of an I.C.Engine mechanism.
CO4	Determine torque transmitting capacity of Clutch, Brake and Dynamometer used in automobiles and machine tools.
CO5	Determine velocity and acceleration of simple mechanism by analytical and graphical methods.
-	-

Course: EM **Course Code: C210**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Learn the basic concept of Metallurgy & Construct the Equilibrium Diagram.
CO2	Demonstrate the sample preparation procedure for Metallography & Understand Macro & Micro structure for various metals for Industrial applications.
CO3	Evaluate & Classify Iron Carbon alloy system and its applications.
CO4	Identify the suitable heat treatment processes for different steels.
CO5	Identify the specific grades of steels and their industrial applications
CO6	Classify the various Nonferrous metals & their alloys for industrial applications.

Course: AT **Course Code: C211**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Explain I.C engines working principle materials used along with losses encountered in fuel air and actual cycle.
CO2	Exemplify requirements of carburation, stages of combustion in SI engines, theory of abnormal combustion and combustion chambers for SI engine.
CO3	Explain fuel injection system, stages of combustion in CI engines, theory of abnormal combustion and combustion chambers for CI engine.
CO4	Measure performance of IC engines experimentally and theoretically for different loading conditions.
CO5	Explain systems necessary for efficient operation of IC engines with emissions, norms and controlling techniques.
CO6	Explain working of air compressors and evaluation of performance for reciprocating air compressor.

Course: EEE **Course Code: C212**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Classify appropriate DC/ induction/ special purpose motor and its speed control methods.
CO2	Develop the industrial application by using suitable motors
CO3	Locate open source platform for Arduino based system development.
CO4	Demonstrate modern controller architecture for Real-world interfacing

Course: M/C SHOP - I **Course Code: C213**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	**Manufacture** of spur gear on milling machine using indexing head
CO2	Surface grinding using table grinder
CO3	**Manufacturing** any one sheet metal component involving minimum three different operation (use dies and press).
CO4	**Manufacturing any** two plastic component like bottle, bottle caps, machine handles, etc .

Class: TE

Course: DME-I HT **Course Code: C301**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	**Manufacture** of spur gear on milling machine using indexing head
CO2	Surface grinding using table grinder
CO3	**Manufacturing** any one sheet metal component involving minimum three different operation (use dies and press).
CO4	**Manufacturing any** two plastic component like bottle, bottle caps, machine handles, etc .

Course: HT **Course Code: C302**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Determine the rate of heat transfer with and without internal heat generation using heat conduction equation for plane wall, cylinder and sphere
CO2	Determine the temperature distribution, fin efficiency and fin effectiveness using the heat conduction equation for infinitely long fin, insulated tip fin and short fin
CO3	Determine the temperature of thermal system for transient condition using lumped system analysis
CO4	Calculate the convective heat transfer rate over plate and through pipe using empirical co-relation along with theoretical aspects of pool boiling
CO5	Determine the radiation heat exchange between the surfaces for application in radiation shield of furnaces
CO6	Compute the efficiency and effectiveness of heat exchanger using LMTD and ϵ-NTU method

Course: TOM-II **Course Code: C303**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Calculate the design parameters of spur gear to avoid interference used in machine tools and automobile applications.
CO2	Estimate forces and torque acting on Helical, Bevel, Worm and Worm Wheel used in machine tools and automobile applications.
CO3	Determine speed and torque in epi-cyclic gear trains used in gear box.
CO4	Generate cam profile for given follower motions to avoid cam jump.
CO5	Synthesize four bar mechanism with analytical and graphical methods.
CO6	Determine Gyroscopic couple or its effect for stabilization of dynamic applications cars, ships, and aeroplane.
CO7	Distinguish between stepped and step-less drive for automobile applications.

Course: TM **Course Code: C304**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Classify turbo machines along with its applications and evaluate performance parameters for flat, inclined plate, curved vane and series of vanes.
CO2	Analyse impulse water turbine with design aspects, selection criteria, performance parameters and characteristics for its use in hydroelectric power plant.
CO3	Evaluate performance parameters of reaction water turbines & draft tube along with discussion of governing mechanism & dimensional analysis.
CO4	Evaluate performance parameters of impulse, and reaction steam turbine along with discussion of nozzles, governing mechanism, selection & losses.
CO5	Evaluate performance parameters of single & multistage centrifugal pumps along with discussion of cavitation, selection & dimensional analysis.
CO6	Evaluate performance parameters of centrifugal compressor along with discussion of theoretical aspect of axial compressor

Course: MQC **Course Code: C305**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Select tool and techniques to determine geometry and dimensions and describe gauges to meet desired needs within realistic constraints.
CO2	Describe measuring parameter of gear and threads using pneumatic and mechanical comparator also explain different surface roughness parameter.
CO3	Determine geometry and dimensions of components in engineering applications using CMM tools and techniques.
CO4	Explain the importance of quality control tools in manufacturing and industrial engineering applications.
CO5	Explain the concepts of basic sampling and acceptance for SQC to plot different statistical curves
CO6	Describe ideas of 5S, Kaizen, Kanban and its applications in engineering industries for continuous improvement process.

Course: SKILL DEVELOPMENT **Course Code: C306**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	To assemble, disassemble and part drawing of tail stock used in machine shop.
CO2	To assemble, disassemble and part drawing of valve (PRV, Sluice valve, Steam stop valve) assembly used in fluid machinery.
CO3	To assemble, disassemble and part drawing of I.C. Engine (4 stroke single cylinder) assembly used in two wheeler.
CO4	To assemble, disassemble and part drawing of hydraulic actuator used in fluid machinery.
CO5	To assemble, disassemble and part drawing of hermetically sealed compressor used in refrigeration and air conditioning system.
CO6	To assemble, disassemble and part drawing of industrial gear box used in automobiles and machine tool.

Course: NMO **Course Code: C307**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Evaluate the roots of equations and simultaneous equations in engineering applications using iterative approach with minimised error.
CO2	Apply graphical, simplex and Newton's optimisation method to solve constrained and unconstrained engineering problems.
CO3	Apply given numerical techniques to solve ordinary differential equations (ODE) and partial differential equations (PDE).
CO4	Apply Lagrange's & Newton's forward interpolation method for regression analysis, and fit different curves by least square technique.
CO5	Evaluate integration of functions using single and double integration numerical techniques.

Course: DME-II **Course Code: C308**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Determine module of Spur Gears to avoid bending and pitting failure for constant speed gear boxes.
CO2	Calculate normal module for Helical Gears and module at the larger end for Bevel Gears.
CO3	Estimate dynamic load rating capacity of rolling contact bearings used in transmission systems based on applied load and expected life.
CO4	Compute efficiency, module, diametral quotient and speed ratio for worm drive used in Industrial Applications
CO5	Carry out selection of belt drives from manufacturing catalogue for Industrial applications and Explain theory of chain and rope drives.
CO6	Determine quantity of lubrication required for sliding contact bearings to ensure proper heat dissipation

Course: RAC **Course Code: C309**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Discuss the applications of refrigeration and air-conditioning and describe refrigerants used in refrigeration & air conditioning systems with their classes, properties, environmental issues, etc.
CO2	Determine performance parameters of simple vapour compression systems using property tables, p-h charts and discuss methods of improving COP.
CO3	Describe working of simple, actual, Li-Br, three fluid vapour absorption refrigeration system.
CO4	Determine the performance parameters of multiple-pressure vapour compression systems using p-h charts and discuss introduction to cryogenics- Linde Hampson cycle.
CO5	Determine properties of moist air and psychrometric process parameters using psychrometric chart at standard atmospheric condition and illustrate thermodynamics of human body, comfort and comfort chart.
CO6	Explain components of refrigeration and air-conditioning systems for domestic and commercial applications.
CO7	Determine pressure losses & size of duct for flow through simple duct system.

Course: MECTX **Course Code: C310**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Determine Sensitivity, Precision and Resolution for sensors used in different measurement systems.
CO2	Construct block diagram using key elements of mechatronics system for household and industrial applications and Solve the block diagram reduction.
CO3	Determine resolution of ADC/DAC as key elements of DAQ system.
CO4	Construct PLC program using PLC programming procedures for household and industrial applications.

CO5	Determine the system stability based on time and frequency domain methods for mechatronics system.
CO6	Determine controller output using Proportional, Integral, Derivative and combinational actions to reduce system errors.

Course: MP-II **Course Code: C311**

After the completion of the course, students will be able

COURSE OUTCOMES	**Statement of CO**
CO1	Determine the force(s) acting on SPCT, Material Removal Rate (MRR),
CO2	Determine machining time in drilling, milling and broaching machine with their application
CO3	Explain grinding machines, grinding wheels and super finishing processes including Honing, Lapping, Buffing and Burnishing
CO4	Explain advanced machining process – EDM, LBM, AJM, USM, and ECM with their Principles, Working, Process Parameters, Advantages, Limitations and Application.
CO5	Compute part programs for simple jobs on CNC machines with Construction working of NC, CNC, DNC and machining center, CNC axes and drives, ATC, apc
CO6	Draw Jigs & Fixtures for simple components with help of elements, Location guidelines, Principles of clamping & guiding

Course: M/C SHOP-II **Course Code: C312**

After the completion of the course, students will be able

COURSE OUTCOMES	**Statement of CO**
CO1	Able to develop knowledge about the working and programming techniques for various machines and tools

Course: Seminar **Course Code: C313**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Explain reviews of research literature published in reputed journals.
CO2	Apply techniques of effective ways of written communication acceptable to journal standards.
CO3	Demonstrate depth of understanding of solution of engineering problems written in reputed Journals.
CO4	Explain the impact of concept in societal, environmental contexts.
CO5	Apply techniques, resource and modern engineering tools to solve complex engineering problem.

Class: BE

Course: H&P **Course Code: C401**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Explain reviews of research literature published in reputed journals.
CO2	Apply techniques of effective ways of written communication acceptable to journal standards.
CO3	Demonstrate depth of understanding of solution of engineering problems written in reputed Journals.
CO4	Explain the impact of concept in societal, environmental contexts.
CO5	Apply techniques, resource and modern engineering tools to solve complex engineering problem.

Course: CAD/CAM **Course Code: C402**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Determine the result of geometrical transformations on 2D objects using homogeneous transformation matrix.
CO2	Formulate mathematical expression of analytical and synthetic curves, surfaces and Select appropriate analytical and synthetic curves and surfaces in part modelling.
CO3	Construct and Analyze structural problem of Mechanical systems for safe working conditions using FEA software and validate the same by classical approach.
CO4	Create a CNC part program and tool path in CAM software for Turning/ Milling using FANUC control.
CO5	Explain various Additive Manufacturing process and design and development of product using rapid prototyping.
CO6	Explain the robotics system and Development of Automated system using Ardiuno interfacing.

Course: DOM **Course Code: C403**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Estimate natural frequency for single DOF undamped & damped free vibratory systems.
CO2	Determine response to forced vibrations due to harmonic excitation, base excitation and excitation due to unbalance forces.
CO3	Estimate natural frequencies, mode shapes for 2 DOF undamped free longitudinal and torsional vibratory systems.
CO4	Apply balancing technique for static and dynamic balancing of multi cylinder inline and radial engines.
CO5	Describe vibration measuring instruments for industrial / real life applications along with suitable method for vibration control.
CO6	Explain noise, its measurement & noise reduction techniques for industry and day today life problems.

Course: ELE-I FEA **Course Code: C404**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Understand the Fundamentals concept of FEA & Techniques used to solve mechanical engineering problems.
CO2	Analyze 1D element structural problems involving bars, beams, trusses.
CO3	Derive and use 2-D element stiffness matrices and load vectors to solve for displacements and stresses.
CO4	Analyze 2D elements for triangular, quadrilateral, iso-parametric Element.
CO5	Analyze steady state heat transfer problems.
CO6	Compute dynamic problems consisting bar, beam element and interpret the result of 3D element structural problems using commercial FEA package.

Course: ELE-I HVAC **Course Code: C412**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Determine the performance parameters of transcritical & ejector systems used in refrigeration system.
CO2	Estimate thermal performance of compressor, evaporator, condenser and cooling tower used in refrigeration systems
CO3	Describe refrigerant piping design, capacity & safety controls and balancing of vapour compressor system
CO4	Explain importance of indoor and outdoor design conditions, IAQ, ventilation and air distribution system used in central air conditioning systems
CO5	Estimate heat transmission through building walls using CLTD and decrement factor &time lag methods with energy-efficient and cost-effective measures for building envelope load of AC system.
CO6	Explain working of types of desiccant, evaporative, thermal storage, radiant cooling, clean room and heat pump air-conditioning systems.

Course: ELE-II OR **Course Code: C413**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Apply concept of linear programming model along with Decision theory for solving problems in the field of production, marketing, agricultural.
CO2	Evaluate optimum transportation and assignment model using the concept of transportation and assignments for minimization and maximization problems.
CO3	Apply the Concept of Game theory in conflicting situations for solving the 2xn or mx2 Game to select optimal strategies.
CO4	Analyze the project networking model using the concepts of PERT and CPM for manufacturing, civil, and system organization field.
CO5	Apply the concept of Queuing and sequencing for minimization and maximization problems to optimize processing time.
CO6	Formulate Integer and Dynamic Programing problem to optimize multi stage decision making.

Course: ELE-II AE **Course Code: C405**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Describe constructional details of vehicles, working of and transmission system in automobile vehicles and understand the recent trends.
CO2	Describe working and constructional details of various Axles, wheels, tyres and steering system.
CO3	Describe working principle of suspension system, breaks and its constructional details.
CO4	Explain safety system and compute vehicle performance and.
CO5	Describe working principle of electrical system and comprehend the overhauling and maintenance of various automotive systems
CO6	Explain constructional details, working of EVs, HEVs and solar vehicles and exposure to automobile related Entrepreneurial acumen. .

Course: ELE-III EAM **Course Code: C414**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Understand india and global energy scenario with varies energy management strategies for the renewable energy resources and energy efficiency.
CO2	Explain importance of energy audit to various thermal systems for the energy consumptions and conservation opportunities.
CO3	Estimate the cost of various energy resources for the energy consuming systems and proficiency of the system.
CO4	Estimate energy performance assessment of Boilers, Furnaces, Heat exchangers, Cooling tower, DG sets, Fans and blowers, Pumps, Compressors, Compressed air system and HVAC systems.
CO5	Understand various components and legislative acts of electrical energy for energy consumption, conservation and efficiency.
CO6	Estimate the carbon credit calculations and CDM projects for cogeneration and heat recovery with Case study: Energy Audit of Institute/Department.

Course: Project-I **Course Code: C406**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Apply the knowledge of engineering fundamentals to design solution of engineering problems
CO2	Formulate problem statements by reviewing research
CO3	Apply approximate techniques, resources, tools to solve engineering problems
CO4	Explain important features of project to assess societal, health, safety, environmental issues with sustainable development
CO5	Apply ethical principal, leadership team work skills, management for solution of complex engineering problem for project.

Course: EE **Course Code: C407**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Illustrate thermal power plant system and cogeneration power plant with detailed explanation of each component depending upon global energy scenario, present status and future scope of power generation in India
CO2	Associate and discuss types of steam condenser used in thermal power plant and environmental impact of thermal power plant .
CO3	Compute theoretical aspects, geological considerations and types of components for hydroelectric and nuclear power plant with economic consideration
CO4	Estimate performance parameter of gas turbine power plant and diesel power plant with their configuration .
CO5	Discuss types of Non-conventional power plant and their commercialization.
CO6	Associate and discuss types of electrical instruments used in power plant and Estimate miscellaneous cost and performances incorporated with types of power generation system.

Course: MSD **Course Code: C408**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Analyze and design machine tool gear box, cylinder, pressure vessel and I.C. engine components for stated specifications.
CO2	Apply the statistical considerations in design to analyze the defects and failure modes in industrial product.
CO3	Design suitable material handling system for bulk load.
CO4	Develop the optimum solutions for weight, cost, size, stiffness using Johnson's method for shaft, helical spring, pressure vessel.

Course: ELE-III TRIBO **Course Code: C409**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Understand the practical aspect of tribology in industry
CO2	Describe theories, laws, measurement of friction and wear.
CO3	Analyze hydrodynamic bearing and performance using derived equations.
CO4	Determine performance of hydrodynamic bearing using derived equations.
CO5	Explain characteristics of Elasto-hydrodynamic lubrication and Gas Lubrication
CO6	Apply the principles of surface engineering for different applications of tribology

Course: ELE-III IE **Course Code: C415**

After the completion of the course, students will be able

COURSE OUTCOMES	Statement of CO
CO1	Describe different aspect of industrial engineering and productivity improvement techniques.
CO2	Apply different concepts of method study to improve the work content

CO3	Describe and analyze techniques of work measurement and time study
CO4	Illustrate different aspect of work system design and production planning control
CO5	Identify various cost accounting and financial management practices applicable in different industries
CO6	Apply concept of engineering economy, ergonomics and industrial safety practices.

Course: ELE-IV AMP **Course Code: C410**

After the completion of the course, students will be able

COURSE OUTCOMES	**Statement of CO**
CO1	Discuss forming and spinning processes for making different Automobile, Aerospace, Energy, Medical, Military and Environmental Parts.
CO2	Explain the process of Friction Stir Welding as it helps to increase the productivity and consumes less time. Also discuss Advanced Die casting to increase the mechanical properties of the product as well as produce good quality of the product.
CO3	Impart Knowledge of advanced techniques for material processing
CO4	Explain different techniques used in micro manufacturing.
CO5	Discuss Additive manufacturing devices and processes to create physical objects that satisfy product development/prototyping requirements.
CO6	Evaluate micro features of tiny parts at high resolution.

Course: ELE-IV PDD **Course Code: C416**

After the completion of the course, students will be able

COURSE OUTCOMES	**Statement of CO**
CO1	Describe fundamentals of Product design and development process, understand conventional and recent trends of Product design and development process
CO2	Identify & formulate customer needs and its tools for the product design & development. Explain mission statement, forecasting.
CO3	Describe information gathering for product development like brain storming, lateral thinking and morphological analysis for product development
CO4	Demonstrate reverse and forward engineering in product development by using teardown process. Explain Benchmarking for the product development process

CO5	Describe conceptually design processes as DFA, DFMEA, design for safety etc. also cost analysis for the effective cost of the product.
CO6	Explain Product life cycle and management and data management concepts.

Course: Project-II **Course Code: C411**

After the completion of the course, students will be able

COURSE OUTCOMES	**Statement of CO**
CO1	Apply the knowledge of engineering fundamentals to design solution of engineering problems
CO2	Formulate problem statements by reviewing research
CO3	Apply approximate techniques, resources, tools to solve engineering problems
CO4	Explain important features of project to assess societal, health, safety, environmental issues with sustainable development
CO5	Apply ethical principal, leadership team work skills, management for solution of complex engineering problem for project.
CO1	Apply the knowledge of engineering fundamentals to design solution of engineering problems

MCA Department

Vision

"The vision of the MCA department is to develop the next generation of high quality Information Technology professionals to cater the needs of the IT Industry."

Mission

- **To strive for excellence in development and deployment of computer applications.**
- **Our efforts are to impart quality and value based education to raise satisfaction level of all Stakeholders.**
- **To prepare the students to face global challenges.**

Program Educational Objective (PEO)

The educational objectives of Master of Computer Application programme are designed to produce competent IT professionals.

PEO1-Students will be able to develop **economically feasible** and **technically robust** software solutions to problems across a broad range of application domains through analysis and design.

PEO2-Students will be able to steer their **career** productively in software industry, academia, research, entrepreneurial pursuit, government, consulting firms and other IT enabled services.

PEO3- To **achieve peer-recognition**; as an individual or in a team; by adopting ethics and professionalism and **communicate effectively** to excel well in **cross culture and inter-disciplinary teams.**

PEO4-To continue a lifelong professional development in computing that **contributes in self and societal growth**.

Program outcomes

On completion of MCA degree, the students will be able to:

PO 1: Apply the knowledge of mathematics and computing fundamentals to various real life applications for any given requirement

PO 2: Design and develop applications to analyze and solve all computer science related problems

PO 3: Design applications for any desired needs with appropriate considerations for any specific need on societal and environmental aspects

PO 4: Integrate and apply efficiently the contemporary IT tools to all computer applications

PO 5: Solve and work with a professional context pertaining to ethics, social, cultural and cyber regulations

PO 6: Function effectively both as a team leader and team member on multi disciplinary projects to demonstrate computing and management skills

PO 7: Communicate effectively and present technical information in oral and written reports

PO 8: Utilize the computing knowledge efficiently in projects with concern for societal, environmental, and cultural aspects

PO 9: Create and design innovative methodologies to solve complex problems for the betterment of the society

PO 10: Apply the inherent skills with absolute focus to function as a successful entrepreneur.

PO 11: An ability to apply knowledge of Networking, Data Structures, Database Management, Programming Languages, Software Engineering, Testing, Mobile Applications, Mathematics.

PSO: Program specific outcomes

1. Students will have the ability to understand the principles and working of computer systems to assess the hardware and software aspects of computer systems.

2. Students will have the ability to understand the structure and development methodologies of software system, that possess professional skills and knowledge of software design process.

3. Students will have the ability to use knowledge in various domains to identify research gaps and hence to provide solution to new ideas and innovations.

4. Implement effective business solutions across an organization that demonstrates appropriate consideration of alternative computer technologies, including networks, servers, programming languages and database systems.

5. Develop, analyze and defend solutions to networking and security problems that demonstrate an appropriate balance among security needs, business concerns, confidentiality, availability and system integrity

6. Develop competence in basic technical subjects in computer applications like Programming Languages, Data Structures, Databases, Operating Systems, Software Engineering.

7. Identify, analyze, formulate and develop computer applications.

8. Use modern computing tools and techniques with confidence.

9. Provide simplest automated solutions to various legacy systems.

10. Map real life scenarios to various theoretical optimal solutions.

Class: MCA I

Course: Problem Solving using C++ (IT11)

After the completion of the course, students will be able to

CO	Statement
01	Use the algorithm paradigms for problem solving.
02	Develop programs with features of the C++ programming language.
03	Develop simple applications using C++
04	Develop programs in the UNIX/Linux programming environment.

Course: Software Engineering using UML (IT12)

After the completion of the course, students will be able to

CO	Statement
01	Distinguish different process model for a software development.
02	Design software requirements specification solution for a given problem definitions of a software system.
03	Apply software engineering analysis/design knowledge to suggest solutions for simulated problems
04	Recognize and describe current trends in software engineering

Course: Database Management System (IT13)

After the completion of the course, students will be able to

CO	Statement
01	Describe the basic concepts of DBMS and various databases used in real applications.
02	Design relational database using E-R model and normalization
03	Demonstrate nonprocedural structural query languages for various database applications
04	Apply concepts of Object Based Database, XML database and non-relational databases.
05	Explain transaction management and recovery management for real applications

Course: Essential of Operating System (IT14)

After the completion of the course, students will be able to

CO	Statement
01	Understand structure of OS, process management and synchronization.
02	Analyze and design Memory Management.
03	Interpret the mechanisms adopted for file sharing in distributed Applications
04	Conceptualize the components and can do Shell Programming.
05	Know Basic Linux System Administration and Kernel Administration.

Course: Business Process Domain (BM11)

After the completion of the course, students will be able to

CO	Statement
01	Describe major bases for marketing mix in business
02	Describe various functionalities of human resource process
03	Identify existing e-commerce model and payment system
04	Apply knowledge to evaluate and manage an effective supply chain.
05	Understand how customer relations are related to business functions and its importance to success of Business entity.
06	Use various banking and insurance process for business development.

Class: MCA II

Course: Advanced Data Structure and C++ programming **(**T1-IT31**)**

After the completion of the course, students will be able to

CO	Statement
01	Write **C++ as well as DS programs with CPP** using advanced language features.
02	utilize OO techniques to design C++ programs,
03	Use the standard C++ library
04	Exploit advanced C++ techniques.

Course: Design and Analysis of Algorithm **(**T1-IT32**)**

After the completion of the course, students will be able to

CO	Statement
01	To understand and learn advance algorithms and methods used in computer science to create strong logic and problem solving approach in student..

Course: Object Oriented Analysis and Design **(**T1-IT33**)**

After the completion of the course, students will be able to

CO	Statement
01	Understand the issues involved in implementing an object-oriented design.
02	Analyze requirements and produce an initial design.
03	Develop the design to the point where it is ready for implementation.
04	Design components to maximize their reuse.
05	Learn to use the essential modeling elements in the most recent release of the Unified Modeling Language.

Course: Advance Internet Technologies **(**T1-IT34**)**

After the completion of the course, students will be able to

CO	Statement
01	To provide extension to web development skills acquired in 2nd semester.
02	HTML 5, XML, jQuery, AJAX and PHP are introduced for student to enhance their skills

Class: MCA III

Course: Software Project Management **(**ITC51**)**

After the completion of the course, students will be able to

CO	Statement
01	To learn process of software project management, cost estimation.
02	Use of project Management tools, configuration management, user roles and software teams.

Course: ASP .Net using C# **(**T1-IT51**)**

After the completion of the course, students will be able to

CO	Statement
01	To teach student application development technology currently available.

Course: Service Oriented Architecture **(**T1-IT52**)**

After the completion of the course, students will be able to

CO	Statement
01	Understand the basic principles of service orientation
02	Learn service oriented analysis techniques
03	Learn technology underlying the service design
04	Learn advanced concepts such as service composition, orchestration and Choreography
05	know about various WS specification standards

Course: Big Data Analytics **(**T1-IT53**)**

After the completion of the course, students will be able to

CO	Statement
01	Understand the Big Data challenges & opportunities ,its applications
02	Gain conceptual understanding of NOSQL Database.
03	Understanding of concepts of map and reduce and functional programming
04	Gain conceptual understanding of Hadoop Distributed File System.

Course: Mobile Application Development **(**T1-IT54**)**

After the completion of the course, students will be able to

CO	Statement
01	Develop the mobile application using Android

MBA Department

Program Educational Objective (PEO)

PEO1: Graduates of the MBA program will successfully integrate core, cross-functional and inter-disciplinary aspects of management theories, models and frameworks with the real world practices and the sector specific nuances to provide solutions to real world business, policy and social issues in a dynamic and complex world.
PEO2: Graduates of the MBA program will possess excellent communication skills, excel in cross-functional,multi-disciplinary, multi-cultural teams, and have an appreciation for local, domestic and global contexts so as to manage continuity, change, risk, ambiguity and complexity.
PEO3: Graduates of the MBA program will be appreciative of the significance of Indian ethos and values in managerial decision making and exhibit value centered leadership.
PEO4: Graduates of the MBA program will be ready to engage in successful career pursuits covering a broad spectrum of areas in corporate, non-profit organizations, public policy, entrepreneurial ventures and engage in life-long learning.
PEO5: Graduates of the MBA program will be recognized in their chosen fields for their managerial competence, creativity & innovation, integrity & sensitivity to local and global issues of social relevance and earn the trust & respect of others as inspiring, effective and ethical leaders, managers, entrepreneurs, intrapreneurs and change agents.

Programme Outcomes (POs):

1. Generic and Domain Knowledge - Ability to articulate, illustrate, analyze, synthesize and apply the knowledge of principles and frameworks of management and allied domains to the solutions of real-world complex business issues
2. Problem Solving & Innovation - Ability to Identify, formulate and provide innovative solution frameworks to real world complex business and social problems by systematically applying modern quantitative and qualitative problem solving tools and techniques
3. Critical Thinking - Ability to conduct investigation of multidimensional business problems using research based knowledge and research methods to arrive at data driven decisions
4. Effective Communication - Ability to effectively communicate in cross-cultural settings, in technology mediated environments, especially in the business context and with society at large
5. Leadership and Team Work - Ability to collaborate in an organizational context and across organizational boundaries and lead themselves and others in the achievement of organizational goals and optimize outcomes for all stakeholders.
6. Global Orientation and Cross-Cultural Appreciation: Ability to approach any relevant business issues from a global perspective and exhibit an appreciation of Cross Cultural aspects of business and management.

7. Entrepreneurship - Ability to identify entrepreneurial opportunities and leverage managerial & leadership skills for founding, leading & managing startups as well as professionalizing and growing family businesses.
8. Environment and Sustainability - Ability to demonstrate knowledge of and need for sustainable development and assess the impact of managerial decisions and business priorities on the societal, economic and environmental aspects.
9. Social Responsiveness and Ethics - Ability to exhibit a broad appreciation of the ethical and value underpinnings of managerial choices in a political, cross-cultural, globalized, digitized, socio-economic environment and distinguish between ethical and unethical behaviors & act with integrity.
10. LifeLong Learning – Ability to operate independently in new environment, acquire new knowledge and skills and assimilate them into the internalized knowledge and skills.

Graduate Attributes (GAs):

GA1: Managerial competence
GA2: Proficiency in Communication, Collaboration, Teamwork and Leadership
GA3: Competence in Creativity & Innovation
GA4: Research Aptitude, Scholarship & Enquiry
GA5: Global Orientation
GA6: Proficiency in ICT & Digital Literacy
GA7: Entrepreneurship & Intrapreneurship Orientation
GA8: Cross-functional & Inter-disciplinary Orientation
GA9: Results Orientation
GA10: Professionalism, Ethical, Values Oriented & Socially Responsible behaviour
GA11: Life-Long Learning Orientation

Course Outcomes

Class: FE(MBA) (Sem-I)

Course: Managerial Accounting **Course Code:101**

After the completion of the course, students will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO101.1	REMEMBERING	DESCRIBE the basic concepts related to Accounting, Financial Statements, Cost Accounting, Marginal Costing, Budgetary Control and Standard Costing
CO101.2	UNDERSTANDING	EXPLAIN in detail, all the theoretical concepts taught through the syllabus.
CO101.3	APPLYING	PERFORM all the necessary calculations through the relevant numerical problems.
CO101.4	ANALYSING	ANALYSE the situation and decide the key financial as well as non-financial elements involved in the situation.
CO101.5	EVALUATING	EVALUATE the financial impact of the decision.

Course: Organizational Behaviour **Code: 102**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO102.1	REMEMBERING	DESCRIBE the major theories, concepts, terms, models, frameworks and research findings in the field of organizational behavior.
CO102.2	UNDERSTANDING	EXPLAIN the implications of organizational behavior from the perspectives of employees, managers, leaders and the organization.
CO102.3	APPLYING	MAKE USE OF the Theories, Models, Principles and Frameworks of organizational behavior in specific organizational settings.
CO102.4	ANALYSING	DECONSTRUCT the role of individual, groups, managers and leaders in influencing how people behave and in influencing organizational culture at large.

CO102.5	EVALUATING	FORMULATE approaches to reorient individual, team, managerial and leadership behaviour in order to achieve organizational goals.
CO102.6	CREATING	ELABORATE UPON the challenges in shaping organizational behavior, organizational culture and organizational change.

Course: Economic Analysis for Business Decisions Course Code: 103

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO103.1	REMEMBERING	DEFINE the key terms in micro-economics.
CO103.2	UNDERSTANDING	EXPLAIN the key terms in micro-economics, from a managerial perspective.
CO103.3	APPLYING	IDENTIFY the various issues in an economics context and DEMONSTRATE their significance from the perspective of business decision making.
CO103.4	ANALYSING	EXAMINE the inter-relationships between various facets of micro-economics from the perspective of a consumer, firm, industry, market, competition and business cycles.
CO103.5	EVALUATING	DEVELOP critical thinking based on principles of micro-economics for informed business decision making.
CO103.6	CREATING	ANTICIPATE how other firms in an industry and consumers will respond to economic decisions made by a business, and how to incorporate these responses into their own decisions.

Course: Business Research Methods Course Code: 104

After the completion of the course, students will be able to:

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO104.1	REMEMBERING	DEFINE various concepts & terms associated with scientific business research
CO104.2	UNDERSTANDING	EXPLAIN the terms and concepts used in all aspects of scientific business research.
CO104.3	APPLYING	MAKE USE OF scientific principles of research to SOLVE contemporary business research problems.
CO104.4	ANALYSING	EXAMINE the various facets of a research problem and ILLUSTRATE the relevant aspects of the research process from a data driven decision perspective.

CO104.5	EVALUATING	JUDGE the suitability of alternative research designs, sampling designs, data collection instruments and data analysis options in the context of a given real-life business research problem from a data driven decision perspective.
CO104.6	CREATING	FORMULATE alternative research designs, sampling designs, data collection instruments, testable hypotheses, data analysis strategies and research reports to address real-life business research problems.

Course: Basics of Marketing **Course Code: 105**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO105.1	REMEMBERING	RECALL and REPRODUCE the various concepts, principles, frameworks and terms related to the function and role of marketing.
CO105.2	UNDERSTANDING	DEMONSTRATE the relevance of marketing management concepts and frameworks to a new or existing business across wide variety of sectors and ILLUSTRATE the role that marketing plays in the 'tool kit' of every organizational leader and manager.
CO105.3	APPLYING	APPLY marketing principles and theories to the demands of marketing function and practice in contemporary real world scenarios.
CO105.4	ANALYSING	EXAMINE and LIST marketing issues pertaining to segmentation, targeting and positioning, marketing environmental forces, consumer buying behavior, marketing mix and Product Life Cycle in the context of real world marketing offering (commodities, goods, services, e-products/ e-services).
CO105.5	EVALUATING	EXPLAIN the interrelationships between segmentation, targeting and positioning, marketing environment, consumer buying behavior, marketing mix and Product Life Cycle with real world examples.
CO105.6	CREATING	DISCUSS alternative approaches to segmentation, targeting and positioning,the marketing environment, consumer buying behavior, marketing mix and Product Life Cycle in the context of real world marketing offering(commodities, goods, services, e-products/ e-services.).

Course: Digital Business **Course Code: 106**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO106.1	REMEMBERING	DESCRIBE the conceptual framework of e commerce, mobile commerce and social commerce.
CO106.2	UNDERSTANDING	SUMMARIZE the impact of information, mobile, social, digital, IOT and related technologies on society, markets & commerce.
CO106.3	APPLYING	ILLUSTRATE value creation & competitive advantage in a digital Business environment.
CO106.4	ANALYSING	EXAMINE the changing role of intermediaries, changing nature of supply chain and payment systems in the online and offline world.
CO106.5	EVALUATING	ELABORATE upon the various types of digital business models and OUTLINE their benefits and limitations.
CO106.6	CREATING	DISCUSS the various applications of Digital Business in the present day world.

Course: Management Fundamentals **Course Code: 107**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO107.1	REMEMBERING	ENUMERATE various managerial competencies and approaches to management..
CO107.2	UNDERSTANDING	EXPLAIN the role and need of Planning, Organizing, Decision Making and Controlling.
CO107.3	APPLYING	MAKE USE OF the principles of goal setting and planning for simple as well as complex tasks and small projects.
CO107.4	ANALYSING	COMPARE and CONTRAST various organizational structures of variety of business and not-for-profit entities in a real world context.
CO107.5	EVALUATING	BUILD a list of the decision making criteria used by practicing managers, leaders and entrepreneurs in routine and non-routine decision making situations and EVALUATE and EXPLAIN the same.
CO107.6	CREATING	FORMULATE and DISCUSS a basic controlling model in a real life business, start-up and not-for-profit organizational context.

Course: Entrepreneurship Development **Course Code: 109**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO109.1	REMEMBERING	DEFINE the key terms, LIST the Attributes and Characteristics of Entrepreneurs features and ENUMERATE the Factors influencing Entrepreneurship Growth.
CO109.2	UNDERSTANDING	DISCUSS various theories of entrepreneurship and the entrepreneurship development ecosystem in Indian context.
CO109.3	APPLYING	APPLY the theories of entrepreneurship and entrepreneurship development framework to analyze and identify entrepreneurial opportunities.
CO109.4	ANALYSING	DISCRIMINATE between potential options available for entrepreneur for embarking on establishing a Start Up
CO109.5	EVALUATING	EVALUATE the start up ecosystem and the entrepreneurial opportunities in light of requirements of a business plan.
CO109.6	CREATING	CREATE a business plan that captures entrepreneurs and variety of entrepreneur motivations, entrepreneur culture and sectoral opportunities and financing options.

Course: Essentials of Psychology for Managers **Course Code: 110**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO110.1	REMEMBERING	DEFINE the basic concepts of psychology.
CO110.2	UNDERSTANDING	EXPLAIN the sensing and perceiving processes.
CO110.3	APPLYING	APPLY principles of learning and conditioning to human behavior.
CO110.4	ANALYSING	ILLUSTRATE the linkages between learning, memory and information processing.
CO110.5	EVALUATING	EXPLAIN the basic intrapersonal processes that influence social perception.

Course: Verbal Communication Lab **Course Code: 113**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO113.1	REMEMBERING	RECOGNIZE the various elements of communication, channels of communication and barriers to effective communication.
CO113.2	UNDERSTANDING	EXPRESS themselves effectively in routine and special real world business interactions.
CO113.3	APPLYING	DEMONSTRATE appropriate use of body language.
CO113.4	ANALYSING	TAKE PART IN professional meetings, group discussions, telephonic calls, elementary interviews and public speaking activities.
CO113.5	EVALUATING	APPRAISE the pros and cons of sample recorded verbal communications in a business context.
CO113.6	CREATING	CREATE and DELIVER effective business presentations, using appropriate technology tools, for common business situations.

Course: Selling & Negotiations Skills Lab **Course Code: 115**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO115.1	REMEMBERING	DESCRIBE the various selling situations and selling types.
CO115.2	UNDERSTANDING	OUTLINE the pre-sales work to be carried out by a professional salesperson.
CO115.3	APPLYING	IDENTIFY the key individuals involved in a real world sales process for a real world product/ service / e-product / e-service.
CO113.4	ANALYSING	FORMULATE a sales script for a real world sales call for a product/ service / eproduct/ e-service.
CO115.5	EVALUATING	DECONSTRUCT the pros and cons of sample real world sales calls for a product/ service / e-product / e-service.
CO115.6	CREATING	DEVELOP a sales proposal for a real world product/ service / e-product / eservice and for a real world selling situation.

Course: MS Excel **Course Code: 116**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO116.1	REMEMBERING	SELECT appropriate menus and functions of MS Excel to Create, Format, Import, Merge, Save, Print Spreadsheets & Charts using business data.
CO116.2	UNDERSTANDING	SHOW how to do basic troubleshooting and fix mistakes most people make when working with spreadsheets.
CO116.3	APPLYING	USE various functions of MS Excel, Execute pivot table analysis, common (and powerful functions), and different types of lookups (vlookup, hlookup, and index/match).
CO116.4	ANALYSING	ILLUSTRATE the use of the most commonly used data-manipulation commands in MS Excel.
CO116.5	EVALUATING	DERIVE insights from multiple data sources in MS EXCEL and work with it to answer relevant business questions.
CO116.6	CREATING	CREATE standard Excel Templates for routine business data management and analysis activities.

Class: FE(MBA) (Sem-II)

Course: Marketing Management **Course Code: 201**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO201.1	REMEMBERING	DESCRIBE the key terms associated with the 4 Ps of marketing.
CO201.2	UNDERSTANDING	COMPARE and CONTRAST various approaches to pricing for a real world marketing offering (commodities, goods, services, e-products/ e-services.)
CO201.3	APPLYING	DEMONSTRATE an understanding of various channel options for a real world marketing offering (commodities, goods, services, e-products/ e-services.)
CO201.4	ANALYSING	EXAMINE the product line of a real world marketing offering (commodities, goods, services, e-products/ e-services.)
CO201.5	EVALUATING	EXPLAIN the role of various communication mix elements for a real world marketing offering (commodities, goods, services, e-products/ e-services.)
CO201.6	CREATING	DESIGN a marketing plan for a real world marketing offering (commodities, goods, services, e-products/ e-services.)

Course: Financial Management **Course Code: 202**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO202.1	REMEMBERING	DESCRIBE the basic concepts related to Financial Management, Various techniques of Financial Statement Analysis, Working Capital, Capital Structure, Leverages and Capital Budgeting..
CO202.2	UNDERSTANDING	EXPLAIN in detail all theoretical concepts throughout the syllabus
CO202.3	APPLYING	PERFORM all the required calculations through relevant numerical problems.
CO202.4	ANALYSING	ANALYZE the situation and • comment on financial position of the firm • estimate working capital required • decide ideal capital structure • evaluate various project proposals
CO202.5	EVALUATING	EVALUATE impact of business decisions on Financial Statements, Working Capital, Capital Structure and Capital Budgeting of the firm

Course: Human Resource Management **Course Code: 203**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO203.1	REMEMBERING	DESCRIBE the role of Human Resource Function in an Organization.
CO203.2	REMEMBERING	ENUMERATE the emerging trends and practices in HRM.
CO203.3	UNDERSTANDING	ILLUSTRATE the different methods of HR Acquisition and retention.
CO203.4	APPLYIMG	DEMONSTRATE the use of different appraisal and training methods in an Organization.
CO203.5	ANALYSING	OUTLINE the compensation strategies of an organization
CO203.6	EVALUATING	INTERPRET the sample job descriptions and job specifications for contemporary entry level roles in real world organizations.

Course: Operations & Supply Chain Management **Course Code: 204**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO203.1	REMEMBERING	DEFINE basic terms and concepts related to Production, Operations, Services, Supply Chain and Quality Management.
CO203.2	UNDERSTANDING	EXPLAIN the process characteristics and their linkages with process-product matrix in a real world context.
CO203.3	UNDERSTANDING	DESCRIBE the various dimensions of production planning and control and their inter-linkages with forecasting.
CO203.4	APPLYIMG	CALCULATE inventory levels and order quantities and MAKE USE OF various inventory classification methods.
CO203.5	ANALYSING	OUTLINE a typical Supply Chain Model for a product / service and ILLUSTRATE the linkages with Customer Issues, Logistic and Business Issues in a real world context.

Course: Contemporary Frameworks in Management **Course Code: 207**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO207.1	REMEMBERING	DEFINE Emotional Intelligence (EQ), IDENTIFY the benefits of emotional intelligence and RELATE the 5 Dimensions of Trait EI Model to the practice of emotional intelligence.
CO207.2	UNDERSTANDING	DESCRIBE how companies achieve transition from being good companies to great companies, and DISCUSS why and how most companies fail to make the transition.
CO207.3	APPLYIMG	APPLY the 21 laws that make leadership work successfully to improve your leadership ability and ILLUSTRATE its positive impact on the whole organization.
CO207.4	ANALYSING	EXAMINE the fundamental causes of organizational politics and team failure.
CO207.5	EVALUATING	EXPLAIN the approach to being effective in attaining goals by aligning oneself to the "true north" principles based on a universal and timeless character ethic.

Course: Start Up and New Venture Management **Course Code: 209**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO209.1	REMEMBERING	DESCRIBE the strategic decisions involved in establishing a startup.
CO209.2	UNDERSTANDING	EXPLAIN the decision making matrix of entrepreneur in establishing a startup.
CO209.3	APPLYIMG	IDENTIFY the issues in developing a team to establish and grow a startup
CO209.4	ANALYSING	FORMULATE a go to market strategy for a startup.
CO209.5	EVALUTAING	DESIGN a workable funding model for a proposed startup.
CO209.6	CREATING	DEVELOP a convincing business plan description to communicate value of the new venture to customers, investors and other stakeholders.

Course: Qualitative Research Methods **Course Code: 210**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO210.1	REMEMBERING	ENUMERATE the key terms associated with Qualitative research approach.
CO210.2	UNDERSTANDING	COMPARE and CONTRAST Qualitative research approach with the Quantitative approach.
CO210.3	APPLYIMG	CONSTRUCT appropriate research and sampling designs for Qualitative research work in real world business and non-business contexts
CO210.4	ANALYSING	ILLUSTRATE the use of appropriate qualitative research methods in real world business and non-business contexts.
CO210.5	EVALUATING	EVALUATE the quality of Qualitative Research work
CO210.6	CREATING	COMBINE Qualitative and Quantitative research approaches in a real world research project.

Course: Industry Analysis - Desk Research **Course Code: 214**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO214.1	REMEMBERING	DESCRIBE the key characteristics of the players in an industry.
CO214.2	UNDERSTANDING	SUMMARIZE the management ethos and philosophy of

		the players in the industry
CO214.3	APPLYIMG	DEMONSTRATE an understanding of the regulatory forces acting on the industry.
CO214.4	ANALYSING	COMPARE and CONTRAST, using tables and charts, the market and financial performance of the players in an industry.
CO214.5	EVALUATING	ASSESS the impact of recent developments on the industry and its key players.
CO214.6	CREATING	PREDICT the future trajectory of the evolution of the industry in the immediate future (1 to 3 years).

Course: Marketing Management **Course Code: 205(MKT)**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO205 MKT .1	REMEMBERING	IDENTIFY and DESCRIBE the key steps involved in the marketing research process.
CO205 MKT .2	UNDERSTANDING	COMPARE and CONTRAST various research designs, data sources, data collection instruments, sampling methods and analytical tools and SUMMARIZE their strengths & weaknesses.
CO205 MKT .3	APPLYIMG	DEMONSTRATE an understanding of the ethical framework that market research needs to operate within.
CO205 MKT .4	ANALYSING	ANALYSE quantitative data and draw appropriate Inferences to address a real life marketing issue.
CO205 MKT .5	EVALUATING	DESIGN a market research proposal for a real life marketing research problem and EVALUATE a market research proposal.
CO205 MKT .6	CREATING	PLAN and UNDERTAKE qualitative or quantitative Market Research and demonstrate the ability to appropriately analyse data to resolve a real life marketing issue.

Course: Consumer Behavior **Course Code: 206(MKT)**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO206 MKT .1	REMEMBERING	ENUMERATE social and psychological factors and their influence his/her behavior as a consumer.
CO206 MKT .2	UNDERSTANDING	EXPLAIN fundamental concepts associated with consumer and organizational buying behavior.
CO206 MKT .3	APPLYIMG	APPLY consumer behavior concepts to real world strategic marketing management decision making.
CO206 MKT .4	ANALYSING	ANALYSE the dynamics of human behavior and the basic factors that influence the consumer's decision process.
CO206 MKT .5	EVALUATING	EXPLAIN the consumer and organizational buying behavior process for a variety of products (goods/services).
CO206MKT .6	CREATING	DISCUSS the use of the Internet, e-commerce & information technology with respect to the changing consumer marketplace and ELABORATE on the various aspects of the changing Indian Consumer.

Course: Integrated Marketing Communications **Course Code: 217(MKT)**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO217 MKT .1	REMEMBERING	DESCRIBE the IMC mix and the IMC planning process.
CO217 MKT .2	UNDERSTANDING	EXAMINE the role of integrated marketing communications in building brand identity, brand equity, and customer franchise.
CO217 MKT .3	APPLYIMG	CONSTRUCT a marketing communications mix to achieve the communications and behavioural objectives of the IMC campaign plan.
CO217 MKT .4	ANALYSING	ANALYZE and critically evaluate the communications effects and results of an IMC campaign to determine its success for a variety of brands.
CO217 MKT .5	EVALUATING	DESIGN a sales promotion campaign and CHOOSE the avenues for Public Relations, Publicity and Corporate

		Advertising for a consumer and a business-to-business product.
CO217MKT .6	CREATING	DEVELOP an integrated cross-media strategy and creative message and concept to reach the target audience and deliver the brand promise through an IMC campaign for a variety of brands.

Course: Product and Brand Management **Course Code: 218 (MKT)**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO218 MKT .1	REMEMBERING	DEFINE the key concepts and DESCRIBE the elements of a product strategy..
CO218 MKT .2	UNDERSTANDING	EXPLAIN the process and methods of brand management, including how to establish brand identity and build brand equity.
CO218 MKT .3	APPLYIMG	IDENTIFY the Brand Marketing Strategies for Leaders, Challengers, Followers and Niche Strategies for real life consumer, business products and services operating in various markets and in the digital space.
CO218 MKT .4	ANALYSING	EXAMINE the key brand concepts by articulating the context of and the rationale of application for real life consumer, business products and services operating in various markets and in the digital space.
CO218 MKT .5	EVALUATING	FORMULATE effective branding strategies for real life consumer, business products and services operating in various markets and in the digital space.
CO218MKT .6	CREATING	COLLECT brand audit data using appropriate tools and PROPOSE strategic recommendations for Reinforcing / Revitalizing / Rejuvenating failed Brands for real life consumer, business products and services in various markets and in the digital space.

Course: Financial Markets and Banking Operations **Course Code: 205 (FIN)**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO205 FIN .1	REMEMBERING	RECALL the structure and components of Indian financial system through banking operations & Financial Markets.
CO205 FIN .2	UNDERSTANDING	UNDERSTAND the concepts of financial markets, their working and importance.
CO205 FIN .3	APPLYIMG	ILLUSTRATE the working and contribution of Banks and NBFCs to the Indian Economy.
CO205 FIN .4	ANALYSING	ANALYZE the linkages in the Financial Markets.
CO205 FIN .5	EVALUATING	EXPLAIN the various banking and accounting transactions.
CO205 FIN .6	CREATING	DEVELOP necessary competencies expected of a finance professional.

Course: Personal Financial Planning **Course Code: 206 (FIN)**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO206 FIN .1	REMEMBERING	UNDERSTAND the need and aspects of personal financial planning
CO206 FIN .2	UNDERSTANDING	Describe the investment options available to an individual
CO206 FIN .3	APPLYIMG	IDENTIFY types of risk and means of managing it
CO206 FIN .4	ANALYSING	DETERMINE the ways of personal tax planning
CO206 FIN .5	EVALUATING	EXPLAIN retirement and estate planning for an individual and design a financial plan.
CO206 FIN .6	CREATING	CREATE a financial plan for a variety of individuals.

Course: Securities Analysis & Portfolio Management **Course Code: 217 (FIN)**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO217 FIN .1	REMEMBERING	REMEMBER various concepts taught in the syllabus.
CO217 FIN .2	UNDERSTANDING	EXPLAIN various theories of Investment Analysis and Portfolio Management.
CO217 FIN .3	APPLYIMG	CALCULATE risk and return on investment using various concepts covered in the syllabus.
CO217 FIN .4	ANALYSING	ANALYZE and DISCOVER intrinsic value of a security.
CO217 FIN .5	EVALUATING	DESIGN/ CREATE optimal portfolio.

Course: Direct Taxation **Course Code: 219 (FIN)**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO219 FIN .1	REMEMBERING	UNDERSTAND various basic concepts/ terminologies related Direct Taxation
CO219 FIN .2	UNDERSTANDING	EXPLAIN how tax planning can be done
CO219 FIN .3	UNDERSTANDING	ILLUSTRATE how online filling of various forms and returns can be done.
CO219 FIN .4	APPLYIMG	CALCULATE Gross Total Income and Income Tax Liability of an individual assessee.
CO219 FIN .5	ANALYSING	ANALYZE and DISCOVER intrinsic value of a security.
CO219 FIN .6	EVALUATING	DESIGN/ DEVELOP / CREATE tax saving plan.

Course: Competency Based Human Resource Management System Course Code: 205(HR)

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO205 HR .1	REMEMBERING	DEFINE the key terms related to performance management and competency development.
CO205 HR .2	UNDERSTANDING	EXPLAIN various models of competency development.
CO205 HR .3	APPLYIMG	PRACTICE competency mapping.
CO205 HR .4	ANALYSING	ANALYSE competencies required for present and potential future job roles at various levels and across variety of organizations.
CO205 HR .5	EVALUATING	DESIGN and MAP their own competency and plan better and appropriate career for themselves.
CO205 HR .6	CREATING	DEVELOP a customized competency model in accordance with the corporate requirements.

Course: Employee Relations and Labour Legislations Course Code: 206(HR)

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO206 HR .1	REMEMBERING	SHOW awareness of important and critical issues in Employee Relations
CO206 HR .2	UNDERSTANDING	INTERPRET and relate legislations governing employee relations.
CO206 HR .3	APPLYIMG	DEMONSTRATE an understanding of legislations relating to working environment.
CO206 HR .4	ANALYSING	OUTLINE the role of government, society and trade union in ER.
CO206 HR .5	EVALUATING	EXPLAIN aspects of collective bargaining and grievance handling.
CO206 HR .6	CREATING	DISCUSS the relevant provisions of various Labour Legislations.

Course: Labour Welfare **Course Code: 217(HR)**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO217 HR .1	REMEMBERING	ENUMERATE the key concepts of the subject matter.
CO217 HR .2	UNDERSTANDING	DESCRIBE the key aspects of the labour policy regulation in the country.
CO217 HR .3	APPLYIMG	IDENTIFY the applicability of various legislations to variety of real world organizations.
CO217 HR .4	ANALYSING	EXAMINE the traditional concept of labour welfare in the industry.
CO217 HR .5	EVALUATING	EXPLAIN the conditions of labour and their welfare and social security needs in the country.
CO217 HR .6	CREATING	ELABORATE upon the perspective of labour problems and remedial measures in the country.

Course: Lab in Recruitment and Selection **Course Code: 218(HR)**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO218 HR .1	REMEMBERING	DESCRIBE the key concepts such as Job Specification, Job description, Recruitment and Selection.
CO218 HR .2	UNDERSTANDING	COMPARE and CONTRAST various methods of Recruitment and Selection.
CO218 HR .3	APPLYIMG	DEVELOP Job Specifications and Job descriptions in a variety of context.
CO218 HR .4	ANALYSING	ANALYZE various Personality types.
CO218 HR .5	EVALUATING	EXPLAIN the profiling techniques used to test Personality, Aptitude, Competency.
CO218 HR .6	CREATING	COMPILE a list of questions for Recruitment and Selection interviews.

Course: Service Operations Management **Course Code: 205(OSCM)**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO205OSCM .1	REMEMBERING	DESCRIBE the nature and CHARACTERISTICS of services and the services economy.
CO205OSCM .2	UNDERSTANDING	DESRCIBE the service design elements of variety of services.
CO205OSCM .3	APPLYIMG	USE service blueprinting for mapping variety of real life service processes.
CO205OSCM .4	ANALYSING	ANALYSE alternative locations and sites for variety of service facilities.
CO205OSCM .5	EVALUATING	JUDGE and EXPLAIN the service orientation at variety of service facilities / organizations.
CO205OSCM .6	CREATING	CREATE flow process layouts for variety of services.

Course:- Supply Chain Management **Course Code: 206(OSCM)**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO206OSCM .1	REMEMBERING	DESCRIBE the key concepts of Supply Chain Management and the – driving forces in contemporary Supply Chain Management.
CO206OSCM .2	UNDERSTANDING	EXPLAIN the structure of modern day supply chains.
CO206OSCM .3	APPLYIMG	IDENTIFY the various flows in real world supply chains.
CO206OSCM .4	ANALYSING	COMPARE and CONTRAST push and pull strategies in Supply Chain Management.
CO206OSCM .5	EVALUATING	EXPLAIN the key Operational Aspects in Supply Chain Management.
CO206OSCM .6	CREATING	DISCUSS the relationship between Customer Value and Supply Chain Management.

Course:- Planning & Control of Operations **Course Code: 217(OSCM)**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO217OSCM .1	REMEMBERING	DESCRIBE the building blocks of Planning & Control of Operations.
CO217OSCM .2	UNDERSTANDING	EXPLAIN the need for aggregate planning and the steps in aggregate planning.
CO217OSCM .3	APPLYIMG	MAKE USE OF the various forecasting approaches in the context of operations planning process.
CO217OSCM .4	ANALYSING	ILLUSTRATE how capacity planning is done in organizations and its relationship with MRP.
CO217OSCM .5	EVALUATING	EXPLAIN the importance of scheduling in operations management.
CO217OSCM .6	CREATING	CREATE a Bill of Materials.

Course:- Productivity Management **Course Code: 218(OSCM)**

After the completion of the course, students will be able

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO218OSCM .1	REMEMBERING	DEFINE various types of productivity and measures of productivity
CO218OSCM .2	UNDERSTANDING	DEMONSTRATE the linkages between various measures of productivity.
CO218OSCM .3	APPLYIMG	APPLY Value Analysis and Value Engineering principles to simple situations related to operations management.
CO218OSCM .4	ANALYSING	APPLY various types of charts and diagrams to carry out work study and method study.
CO218OSCM .5	EVALUATING	DETERMINE the Standard Time using Techniques of Work Measurement.
CO218OSCM .6	CREATING	ELABORATE upon the concepts of JIT, Lean, 5S, TPM, BPR, Six Sigma, World Class manufacturing.