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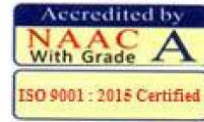# MIC College of Technology
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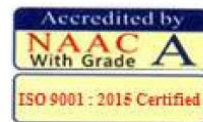ISO 9001 : 2015 Certified

DEPARTMENT OF MMEHANICAL ENGINEERING	
COURSE OUTCOMES (MIC18)	
I SEMESTER (I BTMEH-I SEM)	
18ME1T01	**English-1**
CO 1	Use English language, both written and spoken, competently and correctly
CO 2	Improve comprehension and fluency of speech
CO 3	Gain confidence in using English in verbal situations.
CO 4	Hone the communication skills to meet the challenges of their careers very successfully.
CO 5	Strengthen communication skills in different contexts like formal and informal.
18ME1T02	**Linear Algebra & Differential Equations**
CO 1	Apply the knowledge to solve a system of homogeneous and non-homogeneous linear equations
CO 2	Optimize functions of several variables and able to find extreme values of constrained functions
CO 3	Able to analyze the real-life situations, formulate the differential equations and then applying the methods
CO 4	Apply the knowledge to solve the linear differential equations
CO 5	Provide the techniques of Laplace transformations and able to solve problems related to digital signal processing
18ME1T03	**Engineering Chemistry**
CO 1	study of polymers and composite materials enable us to use them in a goof number of engineering fields
CO 2	Electrochemical principles from the basis of batteries that are being developed. Destruction of metals and alloys can be prevented by undrstanding the sicence of corrosion
CO 3	meythods of purification of water can be known so that more of them can be developed
CO 4	industries are run by the quality of fules and energy crisis can be met by broad unsderstandngh of different fuels
CO 5	importance of engineering materials in the engineering fields can be undertood
18ME1T04	**Problem Solving through C and Python**
CO 1	Understand the basic concepts of programming
CO 2	Understand and Apply loop construct for a given problem
CO 3	Demonstrate the use pointers
CO 4	Understand the use of functions and develop modular reusable code
CO 5	Understand File I/O operations

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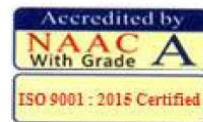Tel.No : 08678-273535/9491457799/7382616824
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18ME1T05	Engineering Mechanics
CO 1	Identify and classify different types of forces acting on static structural systems and Model the problem using free-body diagrams and equilibrium equations
CO 2	Identify and model various types of loading and support conditions that act on structural systems
CO 3	Determine the centroid and moment of inertia for various structural elements
CO 4	Analyze motions of rigid body with concepts of dynamics.
CO 5	Analyze static structural frames subjected to loading by method of joints and method of section
18ME1L06	**English Communication Skills Lab-1**
CO 1	Acquire basic proficiency in English by learning functional aspects of English language
CO 2	Learn the methods of enhancing vocabulary
CO 3	Acquaint himself/herself with nuances of phonetics
18ME1T07	**Engineering Chemistry Lab**
CO 1	student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills
18ME1L08	**Problem Solving Lab using C and Python**
CO 1	Demonstrate Knowledge on various concepts of a C language.
CO 2	Able to draw flowcharts and write algorithms.
CO 3	Able design and development of C problem solving skills.
CO 4	Able to design and develop modular programming skills.
CO 5	Able to trace and debug a program
18ME1T09	**Environmental Studies**
CO 1	The concepts of the ecosystem and its function in the environment the importance of environment current global environmental challenges for the sustenance of the life on planet earth.
CO 2	Natural resources classification and their conservation
CO 3	The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity
CO 4	The various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices
CO 5	The environmental legislations of India and Social issues and the possible means and EIA
II SEMESTER (I BTECH-II SEM)	
18ME2T01	**English-II**
CO 1	Use English language in various contexts

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CO 2	Improve comprehension and fluency of speech
CO 3	Appreciate a literary text
CO 4	Hone the communication skills to meet the challenges of their careers very successfully
CO 5	Understand the need for lifelong learning
18ME2T02	**Vector Calculus and Fourier Transforms**
CO 1	Determine the areas and volumes using multiple integration
CO 2	Interpret the divergence, gradient and curl physically
CO 3	Analyze the general periodic functions in the form of an infinite convergent sine and cosine series
CO 4	Explain the techniques of Fourier transforms
CO 5	Illustrate the methods to solve the boundary value problems
18ME2L03	**Engineering Physics**
CO 1	To identify different crystal structures and to study different point defects.
CO 2	To gain basic knowledge of Simple harmonic waves and study of free and forced vibrations.
CO 3	To Develop the knowledge of science of Acoustics and Ultrasonics and their applications in various fields.
CO 4	The Analytical study of response of materials to Electromagnetic fields.
CO 5	The Study of lasers and optical fibers with an emphasis of their Engineering applications.
18ME2T04	**Biology for Engineers**
CO 1	Understand how biological observations lead to major discoveries and the morphological, Biochemical and ecological classification of organisms
CO 2	Understand that all forms of life have the same building blocks and their involvement in the maintenance and metabolic processes of living organisms
CO 3	Classify enzymes and distinguish between different mechanisms of enzyme action and study the chemical reactions that are catalysed by enzymes. Apply thermodynamic principles to biological systems and able to understand major chemical process that occur within a living organism in order to maintain life
CO 4	Identify DNA as genetic material in the molecular basis of information transfer
CO 5	Identify and classify micro-organisms, Understand media compositions and growth of microorganisms
18ME2T05	**Basic Electronics & Electrical Engineering**
CO 1	Understand basic semiconductor devices
CO 2	Observe characteristics diodes
CO 3	Analyze applications of Semiconductor diodes

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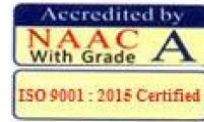
CO 4	Characterize the Bipolar Junction Transistor in different modes
CO 5	Understand the construction and working of Field Effect Transistor
CO 6	To understand the concepts and applications of electronic devices
18ME2T06	**Engineering Graphics**
CO 1	Introduce the students, the techniques of constructing the various types of polygons
CO 2	Understand the concepts of projections and draw projections for simple entities such as points and lines.
CO 3	To visualize projections of planes
CO 4	To visualize projections of solids
CO 5	Analyze the 2D drawings and convert to 3D isometric views & converting Isometric view to Orthographic views
18ME2L07	**Engineering Physics Lab**
CO 1	Implement the basic principles of Optics through various phenomena of light.
CO 2	Implement the basic principles of Mechanics to measure different physical parameters.
CO 3	Enhance the knowledge of Usage of electronic devices in various applications
18ME2L08	**Basic Electronics & Electrical Engineering Lab**
CO 1	Identify, assemble the connections of MCB,switches
CO 2	Implement the DC Motor and DC Generator
CO 3	able to implement Soldering for different circuits
CO 4	able to perform characteristics for Mosfet, BJT, UJT
18ME2L09	**Basic Engineering & IT Workshop**
CO1	Identify, assemble and update the components of a computer
CO2	Configure, evaluate and select hardware platforms for the implementation and execution of computer applications, services and systems
CO3	Make use of tools for converting pdf to word and vice versa
CO4	Develop presentation, documents and small applications using productivity tools such as word processor, presentation tools, spreadsheets, HTML, LaTex
III SEMESTER (II BTECH-I SEM)	
18ME3T01	**Complex variables & Numerical methods**
CO 1	Apply complex functions in the study of fluid mechanics, thermodynamics and electric fields
CO 2	Analyze the analytic function into a power series which is useful in the study of communication systems
CO 3	Illustrate the techniques of the contour integration to determine the real integrals

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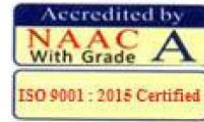
CO 4	Determine the solution of transcendental equations by different numerical methods
CO 5	Illustrate the numerical methods to determine solutions for a class of ordinary differential equations involving irregularly shaped boundaries
18ME3T03	**Kinematics of Machines**
CO 1	Classify, understand and analyze different types of links and mechanisms
CO 2	Acquire knowledge on straight-line motion mechanisms and on hooks joint.
CO 3	Solve the forces, velocities and accelerations in different mechanisms
CO 4	Construct cam profile for different follower motion
CO 5	Describes the power transmission through gears, belts, ropes, and chain drives
18ME3T04	**Thermodynamics**
CO 1	understand the basic laws of thermodynamics
CO 2	apply the laws of thermodynamics
CO 3	understand the concept of entropy, Availability and Irreversibility
CO 4	understand the properties of Steam and use of Steam Tables
CO 5	understand the use of standard cycles and their applications.
18ME3T05	**Materials science and Engineering**
CO 1	Analyze the basic fundamentals of metals, alloys.
CO 2	Understand the properties and classification of cast irons and steels.
CO 3	Analyze properties and applications of nonferrous metals and understand the stability of phases, various heat treatment and strengthening processes.
CO 4	Understand the concepts of powder metallurgy.
CO 5	Understand the concepts of ceramics, composite materials and nano materials.
18ME3T06	**Fluid mechanics & hydraulic machines**
CO 1	Recite fluid properties and fluid statics
CO 2	Understand and analyze fluid kinematics and fluid dynamics
CO 3	Analyze the flow of fluid through pipes and its measurement
CO 4	Acquire the knowledge on fundamentals of turbo machinery
CO 5	Analyze the performance of various types of hydraulic turbines and Pumps
18ME3L07	**Fluid mechanics & Hydraulic machines lab**
CO 1	Determine the efficiency of the jet
CO 2	Determine the efficiencies of pelton wheel, Francis and Kaplan turbines.
CO 3	Determine the efficiencies of pumps.

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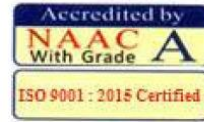
CO 4	Determine the Coefficient of discharge of flow measuring devices
CO 5	Determine the friction factor of a given pipeline & Determine the coefficient of contraction of a given pipe line
18ME3L08	**Mechanics of Solids & Metallurgy LAB**
CO 1	Predict the behavior of ferrous and non-ferrous metals and alloys by studying the microstructure
CO 2	Conduct experiment to find out the hardness of various treated and untreated steels.
CO 3	Conduct tensile, compression, impact and hardness tests to determine the mechanical properties of engineering materials
CO 4	Develop communication and self-learning skills through viva-voce and experiments
18ME3L09	**Proficiency through Reading and Writing**
CO 1	build their vocabulary by following various strategies and use the vocabulary to write meaningful and effective paragraphs
CO 2	learn to identify and avoid the common errors in writing
CO 3	read and review various kinds of books
CO 4	The decentralization of power between Union, State and Local self-government and local administration
CO 5	Election Commission, UPSC, Welfare commissions for sustaining democracy
IV SEMESTER (II BTECH-II SEM)	
18ME4T01	**Probability & Statistics**
CO 1	Understand random variables and discrete probability distributions
CO 2	Determine probabilities based on practical situations using the normal distributions
CO 3	Apply different distributions to compute confidence intervals
CO 4	Test the hypothesis concerning means and proportions
CO 5	Understand the concept of least square estimation linear regression
18ME4T02	**Production Technology**
CO 1	Identify the steps involved in casting, requirements and applications of casting
CO 2	Illustrate the insight into sand casting, types of furnaces, melting and solidification of casting and application of other casting processes
CO 3	Demonstrate the basic knowledge on gas welding and arc welding processes and their applications
CO 4	Identify appropriate bulk forming processes on materials for suitable applications
CO 5	Identify various sheet metal forming operations and their principles

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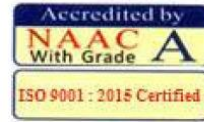
18ME4T03	Design of Machine Elements
CO 1	Apply general and manufacturing considerations in the design of various machine components.
CO 2	Design the machine components using various theories of failures and predict the stress concentration and fatigue in parts subjected to cyclic loads
CO 3	Design riveted, welded and bolted joints.
CO 4	Design the keys, cotters and knuckle joints.
CO 5	Design the shafts, shaft couplings and springs.
18ME4T04	IC Engines & Air Compressors
CO 1	Discuss various losses occur in actual fuel air cycles. & Classify various types of IC Engines and Discuss its lubrication, ignition, fuel meteringand fuel supply systems
CO 2	Distinguish normal and abnormal combustion phenomena in SI and CI engines
CO 3	Perform testing on engines to evaluate engine performance parameters
CO 4	Expalin working of reciprocating and predicts its performance
CO 5	Explain working of rotary compressors and predicts its performance
18ME4T05	Computer Aided Machine Drawing
CO 1	Demonstrate the conventional representations of materials and machine components.
CO 2	Model riveted, welded and key joints using CAD system.
CO 3	Create solid models and sectional views of machine components.
CO 4	Generate solid models of machine parts and assemble them.
CO 5	Create manufacturing drawing with dimensional and geometric tolerances.
18ME4T08	Entrepreneurship & Project Management
CO 1	Role of entrepreneurship in economic development, Opportunities and Challenges
CO 2	Role & Importance, Problems of Women Entrepreneurs
CO 3	Phases,Characteristics of a project, role and responsibilities of project manager.
CO 4	Selection, Project formulation, contents of a project report
CO 5	Institutional finance supporting projects project evaluation
18ME4L09	Production Technology Lab
CO 1	Make single piece and split piece pattern making and prepare components using sand casting
CO 2	Find sand properties and able to apply metal forming operations
CO 3	Make single piece and split piece patterns using wood turning lathe machine

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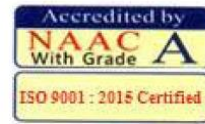
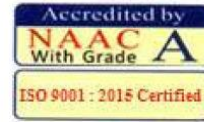|	
CO 4	Make use of plastics materials with injection moulding technique and blow moulding technique
CO 5	Make use of resistance spot welding, manual metal arc welding operations and soldering
18ME4L10	**Thermal engineering Lab**
CO 1	Conduct experiments to evaluate friction power on IC Engines
CO 2	Prepare heat balance sheet on CI/SI engine.
18ME4T11	**Indian Constitution**
CO1	Importance for building a democratic India, features and principles of Indian Constitution.
CO2	The functioning of three wings of the government ie., executive, legislative and judiciary.
CO3	The roles and powers of State Government
CO4	The decentralization of power between Union, State and Local self-Government and local administration
CO5	Election Commission, UPSC, Welfare commissions for sustaining democracy
V SEMESTER (III BTECH-I SEM)	
18ME5T01	**Dynamics of Machines**
CO 1	Analyze stabilization of sea vehicles, aircrafts and automobile vehicles
CO 2	Compute frictional losses, torque transmission of mechanical systems
CO 3	Analyze dynamic force analysis of slider crank mechanism and design of flywheel.
CO 4	Understand balancing of reciprocating and rotary masses.
CO 5	Understand how to determine the natural frequencies of continuous systems starting from the general equation of displacement.
18ME5T02	**Management Science & Productivity**
CO 1	Understand the concepts related to Business
CO 2	Demonstrate the roles, skills and functions of management
CO 3	Analyze effective application of PPM knowledge to diagnose
CO 4	solve organizational problems and develop optimal managerial decisions.
CO 5	Understand the complexities associated with management of human resources in the organizations
18ME5T03	**Turbo Machines**
CO 1	Evaluate performance of thermal power plant with Rankine cycle and analyze flue gas composition.
CO 2	Describes the working and analyze the performance of boilers.
CO 3	analyze and evaluate the performance of steam nozzles and steam turbines
CO 4	analyze and evaluate the performance of steam turbines and steam condensers

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CO 5	Aanalyze and evaluate the performance of Gas turbine and jet engines.
18ME5T04	**MC&MT**
CO 1	Apply the elementary theory of metal cutting and principles in material removal processes
CO 2	Understand the working principles and operations that can be performed on different lathe machines
CO 3	Identify the working principles and operations that can be performed on shaper, slotter, planner machines and drilling machines calculate the material removal rates
CO 4	Understand the working principles and operations that can be performed for producing various features using milling machine tool and select appropriate machining processes for finishing operation with the desired quality
CO 5	Apply appropriate jigs and fixtures on machine tools and write simple CNC programs and conduct CNC machining
18ME5T06	**QUANTATIVE APTITUDE AND REASONING**
CO 1	Understand the basics concepts of Numerical Ability & Reasoning Skills
CO 2	Use the logical thinking and analytical abilities to solve Quantitative aptitude questions from companies specific and other competitive tests
CO 3	Solve questions related to time and distance, time and work ,percentages, simple interest and compound interest etc.
CO 4	Solve questions related to coding and decoding, number series, directions, puzzles ,etc.
CO 5	Understand and solve puzzle related questions for competitive and campus placements exams.
18ME5L13	**Theory of machines Lab**
CO 1	Examine the motion of a motorized gyroscope when the couple is applied along its spin axis.
CO 2	Find the frequency of undamped and damped free vibration of an equivalent spring mass system.
CO 3	Find the position of sleeve against controlling force and speed of a Hartnell governor and to plot the characteristic curve of radius of rotation
CO 4	Interpret the static and dynamic balancing using rigid blocks
CO 5	Interpret the moment of inertia of a flywheel and Determine whirling speed of shaft theoretically and experimentally
18ME5L14	**MT Lab**
CO 1	Make use of Lathe machine tool to produce step turning, taper turning, knurling and threading features on the given workpiece.
CO 2	Understand the working of Milling machine tool to produce grooves.
CO 3	Utilize Drilling machine tool to produce features of cylindrical holes on flat and round surfaces and perform tapping operation

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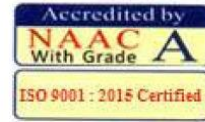
CO 4	Make use of Shaper and Planer machine tools to produce features of slots and pockets on flat surfaces to the desired quality.
CO 5	Utilize Grinding machine tool to produce finished surfaces and grind cutting tools
18ME5L15	**Communication Skills Lab**
CO 1	build their resume effectively
CO 2	learn various nuances of the interview process like JAM/GD/HR interviews
CO 3	enhance their debating and argumentative skills
18ME5T16	**Essence of Indian Traditional Culture**
CO 1	Understand the significance of Indian Traditional Knowledge
CO 2	Classify the Indian Traditional Knowledge
CO 3	Compare Modern Science with Indian Traditional Knowledge system.
CO 4	Analyze the role of Government in protecting the Traditional Knowledge
CO 5	Understand the impact of Philosophical tradition on Indian Knowledge System.
VI SEMESTER (III BTECH-II SEM)	
18ME6T01	**Design of Transmission Elements**
CO 1	The student will able to select the suitable bearing based on the application of the loads and predict the life of the bearing
CO 2	Design of IC Engines parts
CO 3	Design power transmission elements such as gears, belts, chains, pulleys, ropes, levers and power screws.
CO 4	Design power transmission elements such as gears, belts, chains, pulleys, ropes, levers and power screws.
CO 5	Design and analyze of machine tool elements
18ME6T02	**Heat Transfer**
CO 1	Find heat transfer rate for 1D, steady state composite systems with heat generation and performance of pins.
CO 2	Understand the concepts transient heat conduction and basic laws involved in the convection heat transfer
CO 3	Illustrate the concepts of radiation heat transfer
CO 4	Examine the rate of heat transfer in the heat exchangers
CO 5	Examine the rate of heat transfer with phase change
18ME6T03	**Metrology and measurements**
CO 1	Interpret the principles of different types of limits and fits and explain the operating principles of linear and angular measurements.
CO 2	Understanding the principles of surface roughness measurement and apply the knowledge of flatness measurement
CO 3	Illustrate the concepts of gear and screw thread measurements.

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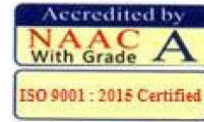Website : www.mictech.edu.in
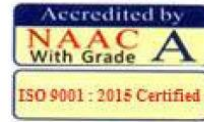
CO 4	Construction of various transducers for displacement measurement and to Understand the working principles of speed measuring instruments
CO 5	Illustrate the operating principles of force and torquemeasurements and to Classify and study the different types of temperature, pressure and sound measuring devices.
18ME6T06	**R & AC**
CO 1	Illustrate the fundamental principles and applications of refrigeration and air conditioning system
CO 2	Obtain cooling capacity and coefficient of performance by conducting test on vapour compression refrigeration systems
CO 3	Present the properties, applications and environmental issues of different refrigerants
CO 4	Calculate cooling load for air conditioning systems used for various
CO 5	Operate and analyze the refrigeration and air conditioning systems.
18ME6T14	**Nanotechnology**
CO 1	Analyze the concepts and preparation methods of Nano materials
CO 2	Understand the nano material properties and their behavior
CO 3	Use various techniques for investigating nano material
CO 4	Know the importance of Nano Technology for advanced materials processing
CO 5	Know the importance of Nano structured Materials for Various Energies.
18ME6L21	**Metrology & Instrumentation Lab**
CO 1	Measure length, height, diameter and angles using various instruments
CO 2	Measure surface roughness with roughness measurement instrument and alignment tests on Lathe Machine tool
CO 3	Apply resistant temperature detector for temperature measurement
CO 4	Utilize LVDT transducer and of rotameter
CO 5	Utilize displacement strain measurement trainer and capacitance measurement trainer
18ME6L22	**Heat Transfer Lab**
CO 1	Find the thermal conductivity of different materials, composite slabs and powders.
CO 2	Solve heat transfer coefficient for free and forced convection and pin fin efficiency for forced and free convection
CO 3	Examine the Stefan Boltzmann Constant and emissivity of grey body.
CO 4	Compare parallel and counter flow heat exchanger performance characteristics and investigation of Lambert's cosine law
CO 5	Solve the heat transfer rate through lagged pipes and heat transfer rate in film and drop wise condensation

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18ME6T23	Disaster Management
CO 1	Differentiate the types of disasters, causes and their impact on environment and society
CO 2	Assess vulnerability and various methods of risk reduction measures as well as mitigation.
CO 3	Draw the hazard and vulnerability profile of India
CO 4	Analyze the Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster
CO 5	Understand about Risk Assessment, Response and Recovery Phases of Disaster
VII SEMESTER (IV BTECH-I SEM)	
18ME7T01	CAD CAM
CO 1	Describe basic structure of CAD workstation, Memory types, input/output devices and display devices and computer graphics
CO 2	Acquire the knowledge of geometric modeling, parametric representation of curves, surfaces and Execute the steps required in CAD software for developing 2D and 3D models and perform transformations
CO 3	Explain fundamental of NC and advanced features of CNC machines
CO 4	Explain fundamentals of part programming
CO 5	Illustrate Automation, CAQC, CIM, VR, AR, AI concepts & applications of robots in manufacturing
18ME7T02	Operational Research
CO 1	Understand the methodology of Operations Research& concepts of linear programming
CO 2	Formulate the solutions to transportation problems
CO 3	Explain the solutions for various sequencing problems
CO 4	Illustrate the solutions to different replacement policies
CO 5	Apply game theory to solve real world problems
18ME7T03	Finite Element Methods
CO 1	Understand the basic concepts of finite element Method
CO 2	Formulate simple problems into finite elements
CO 3	Solve structural and thermal problems.
CO 4	Solve complicated 2D structural problems for stress analysis under various loads
CO 5	Analyze and formulate 1D and 2D problems under steady load conditions. Formulate finite element model under dynamic load conditions.
18ME7T07	Power plant Engineering
CO 1	Select the suitable site for a power plant and propose ash handling, coal handling methods for power plants

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Kanchikacherla-521180, NTR Dist, A.P, India.
Tel.No : 08678-273535/9491457799/7382616824
Website : www.mictech.edu.in

Accredited by
NAAC
With Grade A
ISO 9001 : 2015 Certified
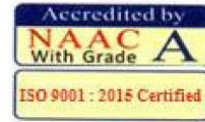
CO 2	:Explain the layout with auxiliaries, construction and working of IC and Gas turbine power plants
CO 3	Explain the basic concepts of hydro electric power plant AND Explain working principle of different types of nuclear power plant
CO 4	Explain working principle of different types of NON-CONVENTIONAL SOURCES
CO 5	Understand Environmental consideration of power plant and Calculate load factor,
18ME7T11	**Advanced Machining Processes**
CO 1	Explain need for Nontraditional processes
CO 2	Explain working principles and applications of various machining processes in advanced machining processes.
CO 3	Understand the working principles and application of EDM, WEDM, ECM
CO 4	Understand the working principles and application of LBM, PAM, EBM
CO 5	Understand the applications of CNC Part Programming, Indexing and CNC applications.
18ME7L12	**CAD CAM Lab**
CO 1	Solve displacements, stress and reactions in a the 2D bar, beam and truss elements
CO 2	Solve displacements, stress and reactions in a the 3D bar, beam and truss elements
CO 3	Understand the steady state heat transfer analysis of plane and Axisymmetric Components.
CO 4	Understand CNC part programming
CO 5	Understand APT part programming
CO 5	Technical report writing.
VIII SEMESTER (IV BTECH-II SEM)	
18ME8T02	**Automobile Engineering**
CO 1	Describe the basic lay-out of an automobile and its components and classify various lubricating and cooling systems of an automobile.
CO 2	Describe various fuel supply and electrical systems and ignition systems in SI and CI engines
CO 3	Understand the concept of power transmission system and vehicle controlling.
CO 4	Explain the principles of suspension and braking System
CO 5	Explain the principles of safety systems and emission standards.
18ME8T04	**Robotics**
CO 1	Understand various applications of robotics and classification of coordinate system and control systems
CO 2	Build the concepts of components of industrial robotics.

DVR & Dr. HS
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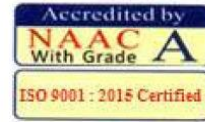
CO 3	Apply kinematic analysis with D-H notation, forward and inverse kinematics and Solve dynamic analysis with Lagrange – Euler and Newton – Euler formulations.
CO 4	Model trajectory planning for a manipulator by avoiding obstacles.
CO 5	Understand different types of actuators and applications of robots in manufacturing.
18ME8T14	**Solar Energy Systems**
CO 1	Significance of renewable energy and describe the principles of solar radiation. Analyze various solar collectors.
CO 2	Know the various storage methods and application of solar energy.
CO 3	Understand the concept of converting wind energy into electrical energy using both horizontal and vertical axis wind machines.
CO 4	Know biomass disasters, functional operation of geothermal systems. Generalize the operation of ocean, tidal and wave energy systems.
CO 5	understand the operating principle of direct energy conversion systems .and to recognize the need and ability to engage in lifelong learning for further developments in this field.