DEPARTMENT OF MECHANICAL ENGINEERING

Course Name	TRANSFORM CALCULUS, FOURIER SERIES AND NUMERICAL TECHNIQUES	Semester	3
Course code	18MAT31	Batch	2018 - 2022

Course Outcomes

C301.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.
C301.2	Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory.
C301.3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.
C301.4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.
C301.5	Determine the extremals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.

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Course Name	MECHANICS OF MATERIALS	Semester	3
Course code	18ME32	Batch	2018 - 2022

Course Outcomes

C302.1	Understand simple, compound, thermal stresses and strains their relations and strain energy.
C302.2	Analyse structural members for stresses, strains and deformations.
C302.3	Analyse the structural members subjected to bending and shear loads.
C302.4	Analyse shafts subjected to twisting loads.
C302.5	Analyse the short columns for stability.

Course Name	BASIC THERMODYNAMICS	Semester	3
Course code	18ME33	Batch	2018 - 2022

Course Outcomes

C303.1	Explain fundamentals of thermodynamics and evaluate energy interactions across the boundary of thermodynamic systems.
C303.2	Evaluate the feasibility of cyclic and non-cyclic processes using 2nd law of thermodynamics.
C303.3	Apply the knowledge of entropy, reversibility and irreversibility to solve numerical problems and apply 1st law of thermodynamics to closed and open systems and determine quantity of energytransfers and change in properties.
C303.4	Interpret the behavior of pure substances and its application in practical problems.
C303.5	Recognize differences between ideal and real gases and evaluate thermodynamic properties of ideal and real gas mixtures using various relations.

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Course Name	MATERIAL SCIENCE	Semester	3
Course code	18MAT34	Batch	2018 - 2022

Course Outcomes

C304.1	Understand the mechanical properties of metals and their alloys.
C304.2	Analyze the various modes of failure and understand the microstructures of ferrous and nonferrous materials.
C304.3	Describe the processes of heat treatment of various alloys.
C304.4	Acquire the Knowledge of composite materials and their production process as well as applications.
C304.5	Understand the properties and potentialities of various materials available and material selection procedures.

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Course Name	METAL CUTTING AND FORMING	Semester	3
Course code	18ME35A/45A	Batch	2018 - 2022

Course Outcomes

C305A.1	Explain the construction & specification of various machine tools.
C305A.2	Discuss different cutting tool materials, tool nomenclature & surface finish.
C305A.3	Apply mechanics of machining process to evaluate machining time.
C305A.4	Analyze tool wear mechanisms and equations to enhance tool life and minimize machining cost
C305A.5	Understand the concepts of different metal forming processes.

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Course Name	METAL CASTING AND WELDING	Semester	3
Course code	18ME35B/45B	Batch	2018 - 2022

Course Outcomes

C305B.1	Describe the casting process and prepare different types of cast products.
C305B.2	Acquire knowledge on Pattern, Core, Gating, Riser system and to use Jolt, Squeeze, Sand Slinger Moulding machines.
C305B.3	Compare the Gas fired pit, Resistance, Coreless, Electrical and Cupola Metal Furnaces.
C305B.4	Compare the Gravity, Pressure die, Centrifugal, Squeeze, slush and Continuous Metal mold castings.
C305B.5	Understand the Solidification process and Casting of Non-Ferrous Metals.

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Course Name	COMPUTER AIDED MACHINE DRAWING	Semester	3
Course code	18ME36A/46A	Batch	2018 - 2022

Course Outcomes

C306A.1	Identify the national and international standards pertaining to machine drawing.
C306A.2	Understand the importance of the linking functional and visualization aspects in the preparation of the part drawings
C306A.3	Apply limits and tolerances to assemblies and choose appropriate fits for given assemblies.
C306A.4	Interpret the Machining and surface finish symbols on the component drawings.
C306A.5	Preparation of the part or assembly drawings as per the conventions.

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Course Name	MECHANICAL MEASUREMENTS AND METROLOGY	Semester	3
Course code	18ME36B/46B	Batch	2018 - 2022

Course Outcomes

C306B.1	Understand the objectives of metrology, methods of measurement, standards of measurement &various measurement parameters.
C306B.2	Explain tolerance, limits of size, fits, geometric and position tolerances, gauges and their design
C306B.3	Understand the working principle of different types of comparators.
C306B.4	Describe measurement of major & minor diameter, pitch, angle and effective diameter of screw threads.
C306B.5	Explain measurement systems, transducers, intermediate modifying devices and terminating devices.

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Course Name	MATERIAL TESTING LAB	Semester	3
Course code	18MEL37A/47A	Batch	2018 - 2022

Course Outcomes

C307A.1	Acquire experimentation skills in the field of material testing.
C307A.2	Develop theoretical understanding of the mechanical properties of materials by performing experiments.
C307A.3	Apply the knowledge to analyse a material failure and determine the failure inducing agent/s.
C307A.4	Apply the knowledge of testing methods in related areas.
C307A.5	Understand how to improve structure/behaviour of materials for various industrial applications.

Course Name	MECHANICAL MEASUREMENTS AND METROLOGY LAB	Semester	3
Course code	18MEL37B/47B	Batch	2018 - 2022

Course Outcomes

C307B.1	Understand Calibration of pressure gauge, thermocouple, LVDT, load cell, micrometre.
C307B.2	Apply concepts of Measurement of angle using Sine Centre/ Sine Bar/ Bevel Protractor, alignmentusing Autocollimator/ Roller set.
C307B.3	Demonstrate measurements using Optical Projector/Tool maker microscope, Optical flats.
C307B.4	Analyse tool forces using Lathe/Drill tool dynamometer.
C307B.5	Analyse Screw thread parameters using 2-Wire or 3-Wire method, gear tooth profile using gear tooth Vernier/Gear tooth micrometre

Course Name	WORKSHOP AND MACHINE SHOP PRACTICE	Semester	3
Course code	18MEL38A/48A	Batch	2018 - 2022

Course Outcomes

C308A.1	To read working drawings, understand operational symbols and execute machining operations.
C308A.2	Prepare fitting models according to drawings using hand tools- V-block, marking gauge, files, hack saw, drills etc.
C308A.3	Understand integral parts of lathe, shaping and milling machines and various accessories and attachments used.
C308A.4	Select cutting parameters like cutting speed, feed, depth of cut, and tooling for various machining operations.
C308A.5	Perform cylindrical turning operations such as plain turning, taper turning, step turning, thread Cutting, facing, knurling, internal thread cutting, eccentric turning and estimate cutting time.

Course Name	FOUNDRY, FORGING AND WELDING LAB	Semester	3
Course code	18MEL38B/48B	Batch	2018 - 2022

Course Outcomes

C308B.1	Demonstrate various skills in preparation of molding sand for conducting tensile, shear andcompression tests using Universal sand testing machine.
C308B.2	Demonstrate skills in determining permeability, clay content and Grain Fineness Number of base sands.
C308B.3	Demonstrate skills in preparation of forging models involving upsetting, drawing and bending operations
C308B.4	Demonstrate skills in determining permeability, clay content and Grain Fineness Number of base sands.

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Course Name	COMPLEX ANALYSIS, PROBABILITY AND STATISTICAL METHODS	Semester	4
Course code	18MAT41	Batch	2018 - 2022

Course Outcomes

C401.1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.
C401.2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.
C401.3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.
C401.4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.
C401.5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.

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Course Name	APPLIED THERMODYNAMICS	Semester	4
Course code	18MAT42	Batch	2018 - 2022

Course Outcomes

C402.1	Apply thermodynamic concepts to analyze the performance of gas power cycles.
C402.2	Apply thermodynamic concepts to analyze the performance of vapour power cycles.
C402.3	Understand combustion of fuels and performance of I C engines.
C402.4	Understand the principles and applications of refrigeration systems.
C402.5	Apply Thermodynamic concepts to determine performance parameters of refrigeration and air-conditioning systems.

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Course Name	FLUID MECHANICS	Semester	4
Course code	18MAT43	Batch	2018 - 2022

Course Outcomes

C403.1	Identify and calculate the key fluid properties used in the analysis of fluid behavior.
C403.2	Explain the principles of pressure, buoyancy and floatation
C403.3	Apply the knowledge of fluid statics, kinematics and dynamics while addressing problems of mechanical and chemical engineering.
C403.4	Describe the principles of fluid kinematics and dynamics.
C403.5	Explain the concept of boundary layer in fluid flow and apply dimensional analysis to form dimensionless numbers in terms of input output variables.

Course Name	KINEMATICS OF MACHINES	Semester	4
Course code	18MAT44	Batch	2018 - 2022

Course Outcomes

C404.1	Knowledge of mechanisms and their motion.
C404.2	Understand the inversions of four bar mechanisms.
C404.3	Analyse the velocity, acceleration of links and joints of mechanisms.
C404.4	Analysis of cam follower motion for the motion specifications.
C404.5	Understand the working of the spur gears.

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Course Name	METAL CUTTING AND FORMING	Semester	4
Course code	18MAT45A	Batch	2018 - 2022

Course Outcomes

C405A.1	Explain the construction & specification of various machine tools.
C405A.2	Discuss different cutting tool materials, tool nomenclature & surface finish.
C405A.3	Apply mechanics of machining process to evaluate machining time.
C405A.4	Analyze tool wear mechanisms and equations to enhance tool life and minimize machining cost.
C405A.5	Understand the concepts of different metal forming processes

Course Name	METAL CASTING AND WELDING	Semester	4
Course code	18ME35B/45B	Batch	2018 - 2022

Course Outcomes

C405B.1	Describe the casting process and prepare different types of cast products.
C405B.2	Acquire knowledge on Pattern, Core, Gating, Riser system and to use Jolt, Squeeze, Sand Slinger moulding machines.
C405B.3	Compare the Gas fired pit, Resistance, Coreless, Electrical and Cupola Metal Furnaces.
C405B.4	Compare the Gravity, Pressure die, Centrifugal, Squeeze, slush and Continuous Metal mould castings.
C405B.5	Understand the Solidification process and Casting of Non-Ferrous Metals.

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Course Name	COMPUTER AIDED MACHINE DRAWING	Semester	4
Course code	18ME36A/46A	Batch	2018 - 2022

Course Outcomes

C406A.1	Identify the national and international standards pertaining to machine drawing.
C406A.2	Understand the importance of the linking functional and visualization aspects in the preparation of the part drawings
C406A.3	Apply limits and tolerances to assemblies and choose appropriate fits for given assemblies.
C406A.4	Interpret the Machining and surface finish symbols on the component drawings.
C406A.5	Preparation of the part or assembly drawings as per the conventions.

Course Name	MECHANICAL MEASUREMENTS AND METROLOGY	Semester	4
Course code	18ME36B/46B	Batch	2018 - 2022

Course Outcomes

C406B.1	Understand Calibration of pressure gauge, thermocouple, LVDT, load cell, micrometre.
C406B.2	Apply concepts of Measurement of angle using Sine Centre/ Sine Bar/ Bevel Protractor, alignmentusing Autocollimator/ Roller set.
C406B.3	Demonstrate measurements using Optical Projector/Tool maker microscope, Optical flats.
C406B.4	Analyse tool forces using Lathe/Drill tool dynamometer.
C406B.5	Analyse Screw thread parameters using 2-Wire or 3-Wire method, gear tooth profile using gear tooth Vernier/Gear tooth micrometre

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Course Name	MATERIAL TESTING LAB	Semester	4
Course code	18ME37A/47A	Batch	2018 - 2022

Course Outcomes

C407A.1	Acquire experimentation skills in the field of material testing.
C407A.2	Develop theoretical understanding of the mechanical properties of materials by performing experiments.
C407A.3	Apply the knowledge to analyse a material failure and determine the failure inducing agent/s.
C407A.4	Apply the knowledge of testing methods in related areas.
C407A.5	Understand how to improve structure/behaviour of materials for various industrial applications.

Course Name	MECHANICAL MEASUREMENTS AND METROLOGY LAB	**Semester**	**4**
Course code	18ME37B/47B	Batch	2018 - 2022

Course Outcomes

C407B.1	Understand Calibration of pressure gauge, thermocouple, LVDT, load cell, micrometer.
C407B.2	Apply concepts of Measurement of angle using Sine Centre/ Sine Bar/ Bevel Protractor, alignment using Autocollimator/ Roller set.
C407B.3	Demonstrate measurements using Optical Projector/Tool maker microscope, Optical flats.
C407B.4	Analyse tool forces using Lathe/Drill tool dynamometer.
C407B.5	Analyse Screw thread parameters using 2-Wire or 3-Wire method, gear tooth profile using gear tooth Vernier/Gear tooth micrometer

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Course Name	WORKSHOP AND MACHINE SHOP PRACTICE	Semester	4
Course code	18MEL38A/48A	Batch	2018 - 2022

Course Outcomes

C408A.1	To read working drawings, understand operational symbols and execute machining operations.
C408A.2	Prepare fitting models according to drawings using hand tools- V-block, marking gauge, files, hack saw, drills etc.
C408A.3	Understand integral parts of lathe, shaping and milling machines and various accessories and attachments used.
C408A.4	Select cutting parameters like cutting speed, feed, depth of cut, and tooling for various machining operations.
C408A.5	Perform cylindrical turning operations such as plain turning, taper turning, step turning, thread Cutting, facing, knurling, internal thread cutting, eccentric turning and estimate cutting time

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Course Name	FOUNDRY, FORGING AND WELDING LAB	Semester	4
Course code	18MEL38B/48B	Batch	2018 - 2022

Course Outcomes

C408B.1	Demonstrate various skills in preparation of molding sand for conducting tensile, shear and compression tests using Universal sand testing machine.
C408B.2	Demonstrate skills in determining permeability, clay content and Grain Fineness Number of base sands.
C408B.3	Demonstrate skills in preparation of forging models involving upsetting, drawing and bending operations.

Course Name	MANAGEMENT AND ECONOMICS	Semester	5
Course code	18ME51	Batch	2018 - 2022

Course Outcomes

C501.1	Understand needs, functions, roles, scope and evolution of Management
C501.2	Understand importance, purpose of Planning and hierarchy of planning and also54nalyse its types.
C501.3	Discuss Decision making, Organizing, Staffing, Directing and Controlling.
C501.4	Select the best economic model from various available alternatives.
C501.5	Understand various interest rate methods and implement the suitable one.

Course Name	DESIGN OF MACHINE ELEMENTS I	Semester	5
Course code	18ME52	Batch	2018 - 2022

Course Outcomes

C502.1	Apply the concepts of selection of materials for given mechanical components.
C502.2	List the functions and uses of machine elements used in mechanical systems.
C502.3	Apply codes and standards in the design of machine elements and select an element based on the Manufacturer's catalogue.
C502.4	Analyse the performance and failure modes of mechanical components subjected to combined loading and fatigue loading using the concepts of theories of failure.
C502.5	Demonstrate the application of engineering design tools to the design of machine components like shafts, couplings, power screws, fasteners, welded and riveted joints.

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Course Name	DYNAMICS OF MACHINES	Semester	5
Course code	18ME53	Batch	2018 - 2022

Course Outcomes

C503.1	Analyse the mechanisms for static and dynamic equilibrium.
C503.2	Carry out the balancing of rotating and reciprocating masses
C503.3	Analyse different types of governors used in real life situation.
C503.4	Analyse the gyroscopic effects on disks, airplanes, stability of ships, two and four wheelers
C503.5	Understand the free and forced vibration phenomenon.

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Course Name	TURBO MACHINES	Semester	5
Course code	18ME54	Batch	2018 - 2022

Course Outcomes

C504.1	Model studies and thermodynamics analysis of turbomachines.
C504.2	Analyse the energy transfer in Turbo machine with degree of reaction and utilisation factor.
C504.3	Classify, analyse and understand various type of steam turbine.
C504.4	Classify, analyse and understand various type of hydraulic turbine.
C504.5	Understand the concept of radial power absorbing machine and the problems involved during its operation.

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Course Name	FLUID POWER ENGINEERING	Semester	5
Course code	18ME55	Batch	2018 - 2022

Course Outcomes

C505.1	Identify and analyse the functional requirements of a fluid power transmission system for a given application.
C505.2	Visualize how a hydraulic/pneumatic circuit will work to accomplish the function.
C505.3	Design an appropriate hydraulic or pneumatic circuit or combination circuit like electro-hydraulics,electro- pneumatics for a given application.
C505.4	Select and size the different components of the circuit.
C505.5	Develop a comprehensive circuit diagram by integrating the components selected for the given application.

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Course Name	OPERATIONS MANAGEMENT	Semester	5
Course code	18ME56	Batch	2018 - 2022

Course Outcomes

C506.1	Explain the concept and scope of operations management in a business context
C506.2	Recognize the role of Operations management among various business functions and its role in the organizations' strategic planning and gaining competitive advantage.
C506.3	Analyze the appropriateness and applicability of a range of operations management systems/models decision making.
C506.4	Assess a range of strategies for improving the efficiency and effectiveness of organizational operation
C506.5	Evaluate a selection of frameworks used in the design and delivery of operations

Course Name	FLUID MECHANICS AND MACHINES LAB	Semester	5
Course code	18MEL57	Batch	2018 - 2022

Course Outcomes

C507.1	Perform experiments to determine the coefficient of discharge of flow measuring devices.
C507.2	Conduct experiments on hydraulic turbines and pumps to draw characteristics.
C507.3	Test basic performance parameters of hydraulic turbines and pumps and execute the knowledge in real life situations.
C507.4	Determine the energy flow pattern through the hydraulic turbines and pumps.
C507.5	Exhibit his competency towards preventive maintenance of hydraulic machines.

Course Name	ENERGY CONVERSION LABORATORY	Semester	5
Course code	18MEL58	Batch	2018 - 2022

Course Outcomes

C508.1	Perform experiments to determine the properties of fuels and oils.
C508.2	Conduct experiments on engines and draw characteristics.
C508.3	Test basic performance parameters of I.C. Engine and implement the knowledge in industry.
C508.4	Identify exhaust emission, factors affecting them and exhibit his competency towards preventivemaintenance of IC engines.

Course Name	FINITE ELEMENT METHODS	**Semester**	**6**
Course code	18ME61	Batch	2018 - 2022

Course Outcomes

C601.1	Identify the application and characteristics of FEA elements such as bars, beams, plane and iso- parametric elements.
C601.2	Develop element characteristic equation and generation of global equation.
C601.3	Formulate and solve Axi-symmetric and heat transfer problems.
C601.4	Apply suitable boundary conditions to a global equation for bars, trusses, beams, circular shafts, heat transfer, fluid flow, axi-symmetric and dynamic problems
C601.5	Develop element characteristic equation and generation of global equation.

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Course Name	DESIGN OF MACHINE ELEMENTS II	Semester	6
Course code	18ME62	Batch	2018 - 2022

Course Outcomes

C602.1	Apply design principles for the design of mechanical systems involving springs, belts, pulleys, and wire ropes.
C602.2	Design different types of gears and simple gear boxes for relevant applications.
C602.3	Understand the design principles of brakes and clutches.
C602.4	Apply design concepts of hydrodynamic bearings for different applications and select Anti friction
C602.5	Apply engineering design tools to product design.

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Course Name	HEAT TRANSFER	Semester	6
Course code	18ME63	Batch	2018 - 2022

Course Outcomes

C603.1	Understand the modes of heat transfer and apply the basic laws to formulate engineering systems.
C603.2	Understand and apply the basic laws of heat transfer to extended surface, composite material and unsteady state heat transfer problems.
C603.3	Analyze heat conduction through numerical methods and apply the fundamental principle to solve radiation heat transfer problems.
C603.4	Analyze heat transfer due to free and forced convective heat transfer.
C603.5	Understand the design and performance analysis of heat exchangers and their practical applications Condensation and Boiling phenomena.

Course Name	NON-TRADITIONAL MACHINING	Semester	6
Course code	18ME641	Batch	2018 - 2022

Course Outcomes

C641.1	Understand the compare traditional and non-traditional machining process and recognize the need for Non- traditional machining process.
C641.2	Understand the constructional features, performance parameters, process characteristics, applications, advantages and limitations of USM, AJM and WJM.
C641.3	Identify the need of Chemical and electro-chemical machining process along with the constructionalfeatures, process parameters, process characteristics, applications, advantages and limitations.
C641.4	Understand the constructional feature of the equipment, process parameters, process characteristics, applications, advantages and limitations EDM & PAM
C641.5	Understand the LBM equipment, LBM parameters, and characteristics. EBM equipment and mechanismof metal removal, applications, advantages and limitations LBM & EBM.

Course Name	NON CONVENTIONAL ENERGY SOURCES	**Semester**	**6**
Course code	18ME651	Batch	2018 - 2022

Course Outcomes

C651.1	Describe the environmental aspects of non-conventional energy resources. In Comparison with various conventional energy systems, their prospects and limitations.
C651.2	Know the need of renewable energy resources, historical and latest developments.
C651.3	Describe the use of solar energy and the various components used in the energy production with respect to applications like-heating, cooling,desalination, power generation, drying, cooking etc.
C651.4	Appreciate the need of Wind Energy and the various components used in energy generation and know the classifications.
C651.5	Understand the concept of Biomass energy resources and their classification, types of biogas Plants- applications

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Course Name	COMPUTER AIDED MODELLING AND ANALYSIS LAB	Semester	6
Course code	18MEL66	Batch	2018 - 2022

Course Outcomes

C606.1	Use the modern tools to formulate the problem, create geometry, descritize, apply boundary conditions to solve problems of bars, truss, beams, and plate to find stresses with different-loading conditions.
C606.2	Demonstrate the ability to obtain deflection of beams subjected to point, uniformly distributed and varying loads and use the available results to draw shear force and bending moment diagrams.
C606.3	Analyze and solve 1D and 2D heat transfer conduction and convection problems with different boundary conditions.
C606.4	Carry out dynamic analysis and finding natural frequencies of beams, plates, and bars for various boundary conditions and also carry out dynamic analysis with forcing functions.

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Course Name	HEAT TRANSFER LAB	**Semester**	**6**
Course code	18MEL67	Batch	2018 - 2022

Course Outcomes

C607.1	Determine the thermal conductivity of a metal rod and overall heat transfer coefficient of composite slabs.
C607.2	Determine convective heat transfer coefficient for free and forced convection and correlate with theoretical values.
C607.3	Evaluate temperature distribution characteristics of steady and transient heat conduction through solid cylinder experimentally.
C607.4	Determine surface emissivity of a test plate and Stefan Boltzmann constant
C607.5	Estimate performance of a refrigerator and effectiveness of a fin and Double pipe heat exchanger

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Course Name	CONTROL ENGINEERING	Semester	7
Course code	18ME71	Batch	2018 - 2022

Course Outcomes

C701.1	Identify the type of control and control actions.
C701.2	Develop the mathematical model of the physical systems.
C701.3	Estimate the response and error in response of first and second order systems subjected standard Input signals.
C701.4	Represent the complex physical system using block diagram and signal flow graph and obtain transfer function.
C701.5	Analyse a linear feedback control system for stability using Hurwitz criterion, Routh's criterion and root Locus technique in complex domain.

Course Name	COMPUTER AIDED DESIGN AND MANUFACTURING	**Semester**	**7**
Course code	18ME72	Batch	2018 - 2022

Course Outcomes

C702.1	**Define Automation, CIM, CAD, CAM and explain the differences between these concepts. Solve simple problems of transformations of entities on computer screen**
C702.2	Explain the basics of automated manufacturing industries through mathematical models and analyze different types of automated flow lines.
C702.3	Analyse the automated flow linestoreduce time and enhance productivity.
C702.4	Explain the use of different computer applications in manufacturing, and able to prepare part programs For simple jobs on CNC machine tools and robot programming.
C702.5	Visualize and appreciate the modern trends in Manufacturing like additive manufacturing, Industry 4.0 and applications of Internet of Things leading to Smart Manufacturing.

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Course Name	TOTAL QUALITY MANAGEMENT	Semester	7
Course code	18ME734	Batch	2018 - 2022

Course Outcomes

C734.1	Explain the various approaches of TQM
C734.2	Infer the customer perception of quality
C734.3	Analyse customer needs and perceptions to design feedback systems.
C734.4	Apply statistical tools for continuous improvement of systems
C734.5	Apply the tools and technique for effective implementation of TQM.

Course Name	MECHATRONICS	Semester	7
Course code	18ME744	Batch	2018 - 2022

Course Outcomes

C744.1	**Illustrate various components of Mechatronics systems.**
C744.2	Assess various control systems used in automation.
C744.3	Design and conduct experiments to evaluate the performance of a mechatronics system or component with respect to specifications, as well as to analyse and interpret data.
C744.4	Apply the principles of Mechatronics design to product design.
C744.5	Function effectively as members of multidisciplinary teams.

Course Name	COMPUTRE AIDED MANUFACTURING LAB	Semester	7
Course code	18MEL76	Batch	2018 - 2022

Course Outcomes

C706.1	**To expose the students to the techniques of CNC programming and cutting tool path generationthrough CNC simulation software by using G-Codes and M-codes.**
C706.2	To educate the students on the usage of CAM packages.
C706.3	To make the students understand the importance of automation in industries through exposure to FMS, Robotics, and Hydraulics and Pneumatics.

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Course Name	DESIGN LAB	Semester	7
Course code	18MEL77	Batch	2018 - 2022

Course Outcomes

C707.1	**Compute the natural frequency of the free and forced vibration of single degree freedom systems, critical speed of shafts.**
C707.2	Carry out balancing of rotating masses.
C707.3	Analyse the governor characteristics.
C707.4	Determine stresses in disk, beams, plates and hook using photo elastic bench.
C707.5	Determination of Pressure distribution in Journal bearing

Course Name	ENERGY ENGINEERING	Semester	8
Course code	18ME81	Batch	2018 - 2022

Course Outcomes

C801.1	Understand the construction and working of steam generators and their accessories.
C801.2	Identify renewable energy sources and their utilization.
C801.3	Understand principles of energy conversion from alternate sources including wind, geothermal, ocean, biomass, nuclear, hydel and tidal.

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Course Name	TRIBOLOGY	Semester	8
Course code	18ME822	Batch	2018 - 2022

Course Outcomes

C822.1	Understand the fundamentals of tribology and associated parameters.
C822.2	Apply concepts of tribology for the performance analysis and design of components experiencing relative motion.
C822.3	Analyse the requirements and design hydrodynamic journal and plane slider bearings for a given application.
C822.4	Select proper bearing materials and lubricants for a given tribological application.
C822.5	Apply the principles of surface engineering for different applications of tribology.