



Kathir College of Engineering

[Approved by AICTE | Affiliated to Anna University | Accredited by NAAC]
Wisdom Tree, Neelambur, Avinashi Road, Coimbatore-62

MECHANICAL ENGINEERING



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Regulation– 2021 – UG

YEAR/SEMESTER : I/I	
C101/HS3151 PROFESSIONAL ENGLISH - I	
C101.1	To listen and comprehend complex academic texts
C101.2	To read and infer the denotative and connotative meaning of technical texts
C101.3	To write definitions, descriptions, narrations and essays on various topics
C101.4	To speak fluently and accurately in formal and informal communicative contexts
C101.5	To express their opinions effectively in both oral and written medium of communication
C102/MA3151 - MATRICES AND CALCULUS	
C102.1	Use the matrix algebra methods for solving practical problems
C102.2	Apply differential calculus tools in solving various application problems
C102.3	Able to use differential calculus ideas on several variable functions
C102.4	Apply different methods of integration in solving practical problems
C102.5	Apply multiple integral ideas in solving area, volumes and other practical problems
C103/PH3151 - ENGINEERING PHYSICS	
C103.1	To make the students effectively to achieve an understanding of mechanics.
C103.2	To enable the students to gain knowledge of electromagnetic waves and its applications.
C103.3	To introduce the basics of oscillations, optics and lasers.
C103.4	Equipping the students to be successfully understand the importance of quantum physics.
C103.5	To motivate the students towards the applications of quantum mechanics.
C104/CY3151 - ENGINEERING CHEMISTRY	
C104.1	To infer the quality of waer from quality parameter data and propose suitable treatment methodologies to treat water
C104.2	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications
C104.3	To apply the knowledge of phase rule and composies for material selection requirements
C104.4	To recommend suitable fuels for engineering processes and applicatons
C104.5	To recognize different forms of energy resources and apply them for suitable



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	applications in energy sectors.
C105/GE3151 - PROBLEM SOLVING AND PYTHON PROGRAMMING	
C105.1	Develop algorithmic solutions to simple computational problems.
C105.2	Develop and execute simple Python programs.
C105.3	Write simple Python programs using conditionals and looping for solving problems.
C105.4	Decompose a Python program into functions.
C105.5	Represent compound data using Python lists, tuples, dictionaries etc.
C105.6	Read and write data from/to files in Python programs.
C106/GE3171 - PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY	
C106.1	Develop algorithmic solutions to simple computational problems
C106.2	Develop and execute simple Python programs.
C106.3	Implement programs in Python using conditionals and loops for solving problems.
C106.4	Deploy functions to decompose a Python program.
C106.5	Process compound data using Python data structures.
C106.6	Utilize Python packages in developing software applications.
C107/ BS3171-PHYSICS AND CHEMISTRY LABORATORY	
CHEMISTRY LABORATORY	
C107.1	To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO
C107.2	To determine the amount of metal ions through volumetric and spectroscopic techniques
C107.3	To analyse and determine the composition of alloys.
C107.4	To learn simple method of synthesis of nanoparticles
C107.5	To quantitatively analyse the impurities in solution by electroanalytical techniques
PHYSICS LABORATORY	
C107.1	To learn the proper use of various kinds of physics laboratory equipment.
C107.2	To learn how data can be collected, presented and interpreted in a clear and concise manner.
C107.3	To learn problem solving skills related to physics principles and interpretation of experimental data.
C107.4	To determine error in experimental measurements and techniques used to minimize such error.



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C107.5	To make the student an active participant in each part of all lab exercises.
C108/ GE3172- ENGLISH LABORATORY	
C108.1	To listen and comprehend complex academic texts
C108.2	To speak fluently and accurately in formal and informal communicative contexts
C108.3	To express their opinions effectively in both oral and written medium of communication
YEAR/SEMESTER : I/II	
C201/ HS3251- PROFESSIONAL ENGLISH II	
C201.1	To compare and contrast products and ideas in technical texts
C201.2	Identify cause and effects in events, industrial processes through technical texts
C201.3	Analyse problems in order to arrive at feasible solutions and communicate them orally and in the written format
C201.4	To report events and the processes of technical and industrial nature
C201.5	To present their opinions in a planned and logical manner, and draft effective resumes in context of job search
C202/ MA3251 - STATISTICS & NUMERICAL METHODS	
C202.1	Apply the concept of testing of hypothesis for small and large samples in real life problems
C202.2	Basic concepts of classifications of design of experiments in the field of agriculture
C202.3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems
C202.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations
C202.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications
C203/ PH3251- MATERIALS SCIENCE	
C203.1	To make the students to understand the basics of crystallography and its importance in studying materials properties.
C203.2	To understand the electrical properties of materials including free electron theory, applications of quantum mechanics and magnetic materials.
C203.3	To instil knowledge on physics of semiconductors, determination of charge carriers and device applications
C203.4	To establish a sound grasp of knowledge on different optical properties of materials, optical displays and applications
C203.5	To inculcate an idea of significance of nano structures, quantum confinement and ensuing nano device applications.



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C204/ BE3251- BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	
C204.1	Compute the electric circuit parameters for simple problems
C204.2	Explain the working principle and applications of electrical machines
C204.3	Analyze the characteristics of analog electronic devices
C204.4	Explain the basic concepts of digital electronics
C204.5	Explain the operating principles of measuring instruments
C205/ GE3251 - ENGINEERING GRAPHICS	
C205.1	Use BIS conventions and specifications for engineering drawing.
C205.2	Construct the conic curves, involutes and cycloid.
C205.3	Solve practical problems involving projection of lines.
C205.4	Draw the orthographic, isometric and perspective projections of simple solids.
C205.5	Draw the development of simple solids.
C206/GE3271-ENGINEERING PRACTICES LABORATORY	
C206.1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.
C206.2	Wire various electrical joints in common household electrical wire work.
C206.3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.
C206.4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.
C207/BE3271- BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY	
C207.1	Use experimental methods to verify the Ohm's and Kirchhoff's Laws.
C207.2	Analyze experimentally the load characteristics of electrical machines
C207.3	Analyze the characteristics of basic electronic devices
C207.4	Use DSO to measure the various parameters
C208/GE3272 - COMMUNICATION LABORATORY	
C208.1	Speak effectively in group discussions held in a formal/semi-formal contexts.
C208.2	Write emails and effective job applications.



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YEAR/SEMESTER : II/III	
C301/MA3351-TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	
C301.1	Understand how to solve the given standard partial differential equations.
C301.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
C301.3	Appreciate the physical significance of Fourier series techniques in solving one- and two-dimensional heat flow problems and one-dimensional wave equations.
C301.4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
C301.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems
C302/ME3351-ENGINEERING MECHANICS	
C302.1	Illustrate the vector and scalar representation of forces and moments
C302.2	Analyse the rigid body in equilibrium
C302.3	Evaluate the properties of distributed forces
C302.4	Determine the friction and the effects by the laws of friction
C302.5	Calculate dynamic forces exerted in rigid body
C303/ME3391-ENGINEERING THERMODYNAMICS	
C303.1	Apply the zeroth and first law of thermodynamics by formulating temperature scales and calculating the property changes in closed and open engineering systems.
C303.2	Apply the second law of thermodynamics in analysing the performance of thermal devices through energy and entropy calculations.
C303.3	Apply the second law of thermodynamics in evaluating the various properties of steam through steam tables and Mollier chart
C303.4	Apply the properties of pure substance in computing the macroscopic properties of ideal and real gases using gas laws and appropriate thermodynamic relations.
C303.5	Apply the properties of gas mixtures in calculating the properties of gas mixtures and applying various thermodynamic relations to calculate property changes.
C304/CE3391-FLUID MECHANICS AND MACHINERY	
C304.1	Understand the properties and behaviour in static conditions. Also, to understand the conservation laws applicable to fluids and its application through fluid kinematics and dynamics



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C304.2	Estimate losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel. Also, to understand the concept of boundary layer and its thickness on the flat solid surface.
C304.3	Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performances of prototype by model studies
C304.4	Explain the working principles of various turbines and design the various types of turbines.
C304.5	Explain the working principles of centrifugal, reciprocating and rotary pumps and design the centrifugal and reciprocating pumps
C305/ME3392-ENGINEERING MATERIALS AND METALLURGY	
C305.1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification.
C305.2	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.
C305.3	Clarify the effect of alloying elements on ferrous and non-ferrous metals.
C305.4	Summarize the properties and applications of non-metallic materials.
C305.5	Explain the testing of mechanical properties.
C306/ME3393-MANUFACTURING PROCESSES	
C306.1	Explain the principle of different metal casting processes.
C306.2	Describe the various metal joining processes.
C306.3	Illustrate the different bulk deformation processes.
C306.4	Apply the various sheet metal forming process.
C306.5	Apply suitable molding technique for manufacturing of plastics components.
C307/ME3381-COMPUTER AIDED MACHINE DRAWING	
C307.1	Prepare standard drawing layout for modelled assemblies with BoM.
C307.2	Model orthogonal views of machine components.
C307.3	Prepare standard drawing layout for modelled parts
C308/ME3382-MANUFACTURING TECHNOLOGY LABORATORY	
C308.1	Demonstrate the safety precautions exercised in the mechanical workshop and join two metals using GMAW.
C308.2	The students able to make the work piece as per given shape and size using machining processes such as rolling, drawing, turning, shaping, drilling and milling.
C308.3	The students become make the gears using gear making machines and analyze the



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	defects in the cast and machined components
YEAR/SEMESTER : II/IV	
C401/ME3491-THEORY OF MACHINES	
C401.1	Discuss the basics of mechanism.
C401.2	Solve problems on gears and gear trains.
C401.3	Examine friction in machine elements.
C401.4	Calculate static and dynamic forces of mechanisms.
C401.5	Calculate the balancing masses and their locations of reciprocating and rotating masses. Computing the frequency of free vibration, forced vibration and damping coefficient.
C402/ME3451-THERMAL ENGINEERING	
C402.1	Apply thermodynamic concepts to different air standard cycles and solve problems.
C402.2	To solve problems in steam nozzle and calculate critical pressure ratio.
C402.3	Explain the flow in steam turbines, draw velocity diagrams, flow in Gas turbines and solve problems.
C402.4	Explain the functioning and features of IC engine, components and auxiliaries.
C402.5	Calculate the various performance parameters of IC engines
C403/ME3492-HYDRAULICS AND PNEUMATICS	
C403.1	Apply the working principles of fluid power systems and hydraulic pumps.
C403.2	Apply the working principles of hydraulic actuators and control components.
C403.3	Design and develop hydraulic circuits and systems.
C403.4	Apply the working principles of pneumatic circuits and power system and its components.
C403.5	Identify various troubles shooting methods in fluid power systems.
C404/ME3493-MANUFACTURING TECHNOLOGY	
C404.1	Apply the mechanism of metal removal process and to identify the factors involved in improving machinability
C404.2	Describe the constructional and operational features of centre lathe and other special purpose lathes.
C404.3	Describe the constructional and operational features of reciprocating machine tools.
C404.4	Apply the constructional features and working principles of CNC machine tools.



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C404.5	Demonstrate the Program CNC machine tools through planning, writing codes and setting up CNC machine tools to manufacture a given component.
C405/CE3491-STRENGTH OF MATERIALS	
C405.1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes.
C405.2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.
C405.3	Apply basic equation of torsion in designing of shafts and helical springs
C405.4	Calculate slope and deflection in beams using different methods.
C405.5	Analyze thin and thick shells for applied pressures.
C406/GE3451-ENVIRONMENTAL SCIENCES AND SUSTAINABILITY	
C406.1	Study the scope and importance of the environment and biodiversity.
C406.2	Gain knowledge on causes, effects, and preventive measures for environmental pollution and environmental protection
C406.3	Apply the concepts of energy management and conservation using renewable sources of energy
C406.4	Develop practices for sustainable development and climate change mitigation
C406.5	Plan an environmental impact assessment and apply green engineering concepts for environmental management
C407/CE3481-STRENGTH OF MATERIALS AND FLUID MACHINERY LABORATORY	
C407.1	Determine the tensile, torsion and hardness properties of metals by testing
C407.2	Determine the stiffness properties of helical and carriage spring
C407.3	Apply the conservation laws to determine the coefficient of discharge of a venturimeter and finding the friction of the given pipe.
C407.4	Apply the fluid static and momentum principles to determine the metacentric height and forces due to impact of jet



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C407.5	Determine the performance characteristics of turbine, rotodynamic pump and positive displacement pump.
C408/ME3461-THERMAL ENGINEERING LABORATORY	
C408.1	Conduct tests to evaluate performance characteristics of IC engines
C408.2	Conduct tests to evaluate the performance of refrigeration cycle
C408.3	Conduct tests to evaluate Performance and Energy Balance on a Steam Generator