



**ZEAL EDUCATION SOCIETY'S
ZEAL COLLEGE OF ENGINEERING AND RESEARCH
NARHE | PUNE -41 | INDIA**



Mechanical Engineering Department

Course Outcomes (COs)

S.E. Mechanical Engineering (2019 Course)

Course Code: 202041	
Name of Course: Solid Mechanics	
C201.1	Define various types of stresses and strain developed on determinate and indeterminate members
C201.2	Draw Shear force and bending moment diagram for various types of transverse loading and support.
C201.3	Compute the slope & deflection, bending stresses and shear stresses on a beam
C201.4	Calculate torsional shear stress in shaft and buckling on the column
C201.5	Apply the concept of principal stresses and theories of failure to determine stresses on a 2-D element
C201.6	Utilize the concepts of SFD & BMD, torsion and principal stresses to solve combined loading application based problems

Course Code: 202042	
Name of Course: Solid Modeling and Drafting	
C202.1	UNDERSTAND basic concepts of CAD system, need and scope in Product Lifecycle Management
C202.2	APPLY knowledge of curves and surfacing features and approaches to create complex solid geometry
C202.3	CONSTRUCT solid models, assemblies using various modeling techniques & PERFORM mass property analysis, including creating and using a coordinate system
C202.4	APPLY geometric transformations to simple 2D geometries
C202.5	USE CAD file formats for different engineering applications like production drawings, 3D printing, FEA, CFD, MBD, CAE, CAM, etc.
C202.6	USE PMI & MBD technique for communication



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Course Code: 202043	
Name of Course: Engineering Thermodynamics	
C203.1	UNDERSTAND the concepts of conservation of mass, conservation of energy, work-Interaction, heat transfer and first law of thermodynamics.
C203.2	APPLY the different gas laws law for different thermodynamic processes.
C203.3	Apply second law of thermodynamics and concept of entropy in analyzing the thermal efficiencies of heat engines such as Carnot and Rankine cycles and the coefficients of performance for refrigerators
C203.4	DETERMINE the properties of steam and their effect on performance of vapour power cycle.
C203.5	DETERMINE Higher and Lower Calorific values of Solid, Liquid & Gaseous fuel.
C203.6	EVALUATE the performance parameters of Steam generators.

Course Code: 202044	
Name of Course: Engineering Materials and Metallurgy	
C204.1	Study crystal structures and estimate various lattice parameters of it.
C204.2	Estimate mechanical properties of material using different testing methods of materials.
C204.3	Study the parameters of system viz., phases, variables, component, grains, grain boundary, and degree of freedom etc. & phase diagrams of different material.
C204.4	Study transformation of steel & Suggest appropriate heat treatment process for a given application.
C204.5	Study various types of steel, Alloy steel, Cast iron & Designation of same.
C204.6	Suggest appropriate material for various applications.



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Course Code: 203156	
Name of Course: Electrical and Electronics Engineering	
C206.1	APPLY programming concepts to UNDERSTAND role of Microprocessor and Microcontroller in embedded systems
C206.2	DEVELOP interfacing of different types of sensors and other hardware devices with Atmega328 based Arduino Board
C206.3	UNDERSTAND the operation of DC motor, its speed control methods and braking
C206.4	DISTINGUISH between types of three phase induction motor and its characteristic features
C206.5	EXPLAIN about emerging technology of Electric Vehicle (EV) and its modular subsystems
C206.6	CHOOSE energy storage devices and electrical drives for EVs

Course Code: 202045	
Name of Course: Geometric Dimensioning and Tolerancing Lab	
C205.1	Select appropriate IS and ASME standards for drawing
C205.2	Read & Analyse variety of industrial drawings
C205.3	Apply geometric and dimensional tolerance, surface finish symbols in drawing
C205.4	Evaluate dimensional tolerance based on type of fit, etc
C205.5	Select an appropriate manufacturing process using DFM, DFA, etc.

Course Code: 207002	
Name of Course: Engineering Mathematics - III	
C2072.1	SOLVE higher order linear differential equations and its applications to model and analyze mass spring systems
C2072.2	APPLY Integral transform techniques such as Laplace transform and Fourier transform to solve differential equations involved in vibration theory, heat transfer and related mechanical engineering applications
C2072.3	APPLY Statistical methods like correlation, regression in analyzing and interpreting experimental data applicable to reliability engineering and probability theory in testing and quality control.
C2072.4	PERFORM Vector differentiation & integration, analyze the vector fields and APPLY to fluid flow problems
C2072.5	SOLVE Partial differential equations such as wave equation, one and two dimensional heat flow equations



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Course Code: 202047	
Name of Course: Kinematics of Machinery	
C207.1	APPLY kinematic analysis to simple mechanisms
C207.2	ANALYZE velocity and acceleration in mechanisms by Analytical and graphical method
C207.3	SYNTHESIZE a four bar mechanism with analytical and graphical methods
C207.4	APPLY fundamentals of gear theory as a prerequisite for gear design
C207.5	CONSTRUCT cam profile for given follower motion
C207.6	UNDERSTAND Fundamentals of Automations used in industry

Course Code: 202048	
Name of Course: Applied Thermodynamics	
C208.1	Calculate COP of refrigeration system and analyze psychrometric processes
C208.2	Discuss basics of engine terminology, air standard, fuel air and actual cycles.
C208.3	Understand factors affecting the combustion performance of SI and CI engines and to study factors affecting knocking and detonation.
C208.4	Determine performance parameters of IC Engines, importance of testing and emission control
C208.5	Study working of various IC Engine systems and use of alternative fuels
C208.6	Determine performance of single and multi-stage reciprocating compressors and discuss rotary positive displacement compressors

Course Code: 202049	
Name of Course: Fluid Mechanics	
C209.1	Determine the various properties of fluids and Analyze it for various applications.
C209.2	Apply the laws of fluid statics and Identify types of fluid pressure measurement devices and Understand the concepts of buoyancy.
C209.3	Understand the different approach of fluid flow and Identify types of fluid flow and fluid flow field.
C209.4	Apply the laws of fluid dynamics and Identify types of fluid discharge measurement devices and Analyze the Velocity and shear Stress distribution for flow in plates and Velocity profile.



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C209.5	Identify hydro dynamically boundaries and Estimate the friction losses in internal and external fluid flow and Analyze the forces drag and lift on immersed bodies.
C209.6	Construct mathematical correlation considering dimensionless number and Analyze the performance of prototype using model laws.

Course Code: 202050	
Name of Course: Manufacturing Processes	
C2050.1	SELECT appropriate castings processes, pattern making, Core making approaches & Determine mould filling time, Solidification rate & dimension of Riser for casting process
C2050.2	UNDERSTAND the different metal forming approaches & Estimate load required for Metal forming process.
C2050.3	STUDY the sheet metal forming processes & Evaluate cutting forces, Centre of pressure and blank size determination & Design Strip Layout
C2050.4	CLASSIFY & STUDY the welding processes and Estimate heat balance in welding
C2050.5	DISTINGUISH various plastics and STUDY polymer processing techniques
C2050.6	STUDY Composites & its manufacturing techniques

Course Code: 202051	
Name of Course: Machine Shop	
C2051.1	PERFORM welding using TIG/ MIG/ Resistance/Gas welding technique
C2051.2	MAKE Fibre-reinforced Composites by hand lay-up process or spray lay-up techniques
C2051.3	PERFORM cylindrical/surface grinding operation and CALCULATE its machining time
C2051.4	DETERMINE number of indexing movements required and acquire skills to PRODUCE a spur gear on a horizontal milling machine
C2051.5	PREPARE industry visit report
C2051.6	UNDERSTAND procedure of plastic processing



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Course Code: 202052	
Name of Course: Project Based Learning - II	
C2052.1	IDENTIFY the real-world problem (possibly of interdisciplinary nature) through a rigorous literature survey and formulate / set relevant aims and objectives
C2052.2	ANALYZE the results and arrive at valid conclusions.
C2052.3	PROPOSE a suitable solution based on the fundamentals of mechanical engineering by possibly integration of previously acquired knowledge.
C2052.4	CONTRIBUTE to society through proposed solutions by strictly following professional ethics and safety measures.
C2052.5	USE of technology in proposed work and demonstrate learning in oral and written form.
C2052.6	DEVELOP ability to work as an individual and as a team member.