



**DEPARTMENT MECHANICAL ENGINEERING**  
**2017 SCHEME CO's**

Course Code	Course Name	CO Code	CO
17MAT31	Engineering Mathematics – III	CO1	Know the use of periodic signals and Fourier series to analyze circuits and system communication.
		CO2	Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier transforms and Z-transform
		CO3	Employ appropriate Numerical methods to solve algebraic and transcendental equations
		CO4	Apply Greens theorem, Divergence theorem and Stokes theorem in various applications in the field of elector-magnetic and gravitational fields and fluid flow problems.
		CO5	Determine the extremals of functionals and solve the simple problems of the calculus of variations
17ME32	Materials Science	CO1	Understanding the structure and various modes of failure in materials
		CO2	Describe the mechanical properties of Engineering Materials
		CO3	Learn the means of modifying properties, as well as the processing and failure of materials
		CO4	Understand the use of materials for various applications oh metals and non-metals
		CO5	Explore the mechanical property of Composite materials
17ME33	Basic Thermodynamics	CO1	Explain thermodynamic systems, properties, Zeroth law of thermodynamics, temperature scales and energy interactions
		CO2	Determine heat, work, internal energy, enthalpy for flow & non flow process using First and Second Law of Thermodynamics.
		CO3	Interpret behavior of pure substances and its applications to practical problems.
		CO4	Determine enthalpy and change in entropy using TD relations for ideal gases



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		CO5	Calculate Thermodynamics properties of real gases at all ranges of pressure, temperatures using modified equation of state including Vander Waals equation, Redlich Wong equation and Beattie
17ME34	Mechanics of Materials	CO1	• Understand simple, compound, thermal stresses and strains their relations, Poisson's ratio, Hooke's law, mechanical properties including elastic constants and their relations
		CO2	Determine stresses, strains and deformations in bars with varying circular and rectangular cross-sections subjected to normal and temperature loads And Determine plane stress, principal stress, maximum shear stress and their orientations using analytical method and Mohr's circle
		CO3	Determine the dimensions of structural members including beams, bars and rods using Energy methods and also stress distribution in thick and thin cylinders
		CO4	Draw SFD and BMD for different beams including cantilever beams, simply supported beams and overhanging beams subjected to UDL, UVL, Point loads and couples And Determine dimensions, bending stress, shear stress and its distribution in beams of circular, rectangular, symmetrical I and T sections subjected to point loads and UDL
		CO5	Determine the dimensions of shafts based on torsional strength, rigidity and flexibility and also elastic stability of columns using Rankin's and Euler's theory
17ME35B	Machine Tools and Operations	CO1	Explain the construction & specification of various machine tools
		CO2	Describe various machining processes pertaining to relative motions between tool & work piece
		CO3	Discuss different cutting tool materials, tool nomenclature & surface finish
		CO4	Apply mechanics of machining process to evaluate machining time



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		CO5	Analyze tool wear mechanisms and equations to enhance tool life and minimize machining cost
17ME36B	Mechanical Measurements and Metrology	CO1	Understand the objectives of metrology, methods of measurement, selection of measuring instruments, standards of measurement and calibration of end bars. Describe slip gauges, wringing of slip gauges and building of slip gauges, angle measurement using sine bar, sine center, angle gauges, optical instruments and straightness measurement using Autocollimator
		CO2	Explain tolerance, limits of size, fits, geometric and position tolerances, gauges and their design. Understand and explain the principle of Johnson Mikrokator, sigma comparator, dial indicator, LVDT, back pressure gauges, Solex comparators and Zeiss Ultra Optimeter
		CO3	Describe measurement of major diameter, minor diameter, pitch, angle and effective diameter of screw threads by 2 – wire, 3 – wire methods, screw thread gauges and tool maker’s microscope. Explain measurement of tooth thickness using constant chord method, addendum comparator methods and base tangent method, composite error using gear roll tester and measurement of pitch, concentricity, run out and involute profile Understand laser interferometers and Coordinate measuring machines.
		CO4	Explain measurement systems, transducers, intermediate modifying devices and terminating devices
		CO5	Describe functioning of force, torque, pressure, strain and temperature measuring devices.
17MEL37B	Mechanical Measurements and Metrology Lab	CO1	To calibrate pressure gauge, thermocouple, LVDT, load cell, micrometer
		CO2	To measure angle using Sine Centre/ Sine



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			Bar/ Bevel Protractor, alignment using Autocollimator
		CO3	To demonstrate measurements using Optical Projector/Tool maker microscope, Optical flats. And force measurement by drill tool dynamometer/Lathe tool dynamomete
		CO4	To measure Screw thread parameters using 2-Wire or 3-Wire method, gear tooth profile using gear tooth Vernier/Gear tooth micrometer
		CO5	To measure surface roughness using Tally Surf/ Mechanical Comparator
17MEL38B	Machine Shop	CO1	Perform turning , facing , knurling , thread cutting, tapering , eccentric, turning and allied operations
		CO2	Perform keyways / slots , grooves etc using shaper
		CO3	Perform gear tooth cutting using milling machine
		CO4	Understand the formation of cutting tool parameters of single point cutting tool using bench grinder / tool and cutter grinder
		CO5	Understand Surface Milling/Slot Milling, Exhibit interpersonal skills towards working in a team
17CPH39	Constitution of India, Professional Ethics and Human Rights	CO1	Learn in details with examples To assimilate and get familiarized with basic information about Indian constitution
		CO2	Specify in details with examples provide overall legal literacy to the young technograts to manage complex societal issues in the present scenario.
		CO3	Learn the characteristics of To identify their individual roles and ethical responsibilities towards society.
		CO4	Specify in depth To understand engineering ethics & responsibilities
		CO5	Deliberate in details with application, if applicable, To understand engineering ethics & responsibilities, through the learning of



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			these topics students will be able to understand human rights/ values and its implications in their life.
17MAT41	17MAT41-Engineering Mathematics-IV	CO1	Solve first order ordinary differential equation arising in flow problems using single step and multi-step numerical methods.
		CO2	Solve second order ordinary differential equation arising in flow problems using single step numerical methods and Illustrate problems of potential theory, quantum mechanics and heat conduction by employing notions and properties of Bessel's functions and Legendre's polynomials
		CO3	Explain the concepts of analytic functions, residues, poles of complex potentials and describe conformal and Bilinear transformation arising in field theory and signal processing.
		CO4	Develop probability distribution of discrete, continuous random variables and joint probability distribution occurring in digital signal processing, information theory and design engineering
		CO5	Demonstrate testing of hypothesis of sampling distributions and illustrate examples of Markov chains related to discrete parameter stochastic process
17ME42	KINEMATICS OF MACHINERY	CO1	To Identify mechanisms with basic understanding of motions.
		CO2	To comprehend velocity and acceleration analysis by graphical method, Instantaneous center method and kleins construction.
		CO3	To comprehend velocity and acceleration analysis by analytical method and Freudensteins equation.
		CO4	To comprehend and carry out motion analysis of gears and gear trains.
		CO5	To comprehend and carry out motion analysis of CAMS.
17ME43	APPLIED THERMODYNAMICS	CO1	Apply thermodynamic concepts to analyze the performance of gas power cycles including

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			propulsion systems
		CO2	Evaluate the performance of steam turbine components.
		CO3	Understand combustion of fuels and combustion processes in I C engines including alternate fuels and pollution effect on environment
		CO4	Determine performance parameters of refrigeration and air-conditioning systems. Understand the principles and applications of refrigeration systems. Analyze air-conditioning processes using the principles of psychrometry and Evaluate cooling and heating loads in an air-conditioning system
		CO5	Understand the working, applications, relevance of air and identify methods for performance improvement. Apply thermodynamic concepts to analyze turbo machines
17ME44	FLUID MECHANICS	CO1	Identify and calculate the key fluid properties used in the analysis of fluid behavior. Understand and apply the principles of pressure, buoyancy and floatation
		CO2	To understand the flow characteristic and dynamics of flow field for various Engineering applications • To know how velocity changes and energy transfers in fluid flows are related to forces and torques and to understand why designing for minimum loss of energy in fluid flows is so important.
		CO3	To discuss the main properties of laminar and turbulent pipe flow and appreciate their differences and the concept of boundary layer theory
		CO4	Understand the concept of dynamic similarity and how to apply it to experimental modeling
		CO5	To appreciate the consequences of compressibility in gas flow and understand the effects of friction and heat transfer on compressible flows



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17ME45A	Metal Casting and Welding	CO1	Describe the casting process, preparation of Green, Core, dry sand molds and Sweep, Shell, Investment and plaster molds. Explain the Pattern, Core, Gating, Riser system and Jolt, Squeeze, Sand Slinger Molding Machines
		CO2	Compare the Gas fired pit, Resistance, Coreless, Electrical and Cupola Metal Furnaces. Compare the Gravity, Pressure die, Centrifugal, Squeeze, slush and Continuous Metal mold castings.
		CO3	Explain the Solidification process and Casting of Non-Ferrous Metals.
		CO4	Describe the Metal Arc, TIG, MIG, Submerged and Atomic Hydrogen Welding processes used in manufacturing. Explain the Resistance spot, Seam, Butt, Projection, Friction, Explosive, Thermit, Laser and Electron Beam Special type of welding process used in manufacturing
		CO5	Describe the Metallurgical aspects in Welding and inspection methods for the quality assurance of components made of casting and joining process.
17ME46A	Computer Aided Machine Drawing	CO1	Identify the national and international standards pertaining to machine drawing.
		CO2	Understand the importance of the linking functional and visualization aspects in the preparation of the part drawings
		CO3	Apply limits and tolerances to assemblies and choose appropriate fits for given assemblies.
		CO4	Interpret the Machining and surface finish symbols on the component drawings
		CO5	Preparation of the part or assembly drawings as per the conventions
17MEL47A	Materials Testing Lab	CO1	To learn the concept of the preparation of samples to perform characterization such as microstructure, volume fraction of phases and grain size.
		CO2	To understand mechanical behavior of various engineering materials by conducting standard



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			tests
		CO3	To learn material failure modes.
		CO4	To UNDERSTAND different loads causing failure.
		CO5	To learn the concepts of improving the mechanical properties of materials by different methods like heat treatment, surface treatment etc.
17MEL48A	Foundry and Forging Lab	CO1	Demonstrate compression, Shear , Ustm, Permeability Sand Tests
		CO2	Demonstrate Sieve Analysis And Clay Content Test
		CO3	Demonstrate Foundry Tools And Sand Preparation With Pattern And Without Pattern
		CO4	Demonstrate Foundry Tools And Sand Preparation With Core And Aluminium Casting
		CO5	Demonstrate Various Skills Of Forging Operations.
17KKL49	KANNADA KALI	CO1	To Read and understand the simple words in Kannada language, meaning in English ,equivalent words in english, grammar, form the sentences in kannada language, dialogue creation, learn about epics.
		CO2	To learn Kannada for Communication ,enquiries, sentence formation, request writing, conversations and meaning in English, adjectives.
		CO3	To learn creating present tense kannada sentences, potential forms, no-past continuous , imperative, understanding and answering.
		CO4	Learn to form Past tense sentences, discussing about a film, describing brindavan garden.
		CO5	To learn to converse routine activities of a student, grammar, present, past and perfect negations, reflexive, telephonic conversations, and to create some interest on Kannada Language and Literature.





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17KKM49	KANNADA MANASU	CO1	Understand Kannada as administrative Language, Patra Vyavahara & Kannada vyakarana, different formats of letter writing, invitations and advertisements.
		CO2	To Become Familiar about prose, language and poems, grammar and practise, writing letter, reports and essays
		CO3	To become familiar with poems, great personalities of kannada sahithya Da. Ra. Bendre, Dr. Sir. M Vishveshvaraya, Shivarama Karanth & Kuvempu, BGL Swamy.
		CO4	Analyse the works of Belgiya haadu by Siddalingaiah, Ella hudugiyara kanassu & story Neethu. K.P Poornachandra Tejaswi Gandhi story by Besagara halli Ramanna.
		CO5	Understand Parisara Lekhana, Vrutthi shikshanadalli Kannada madhyama & Konave gowda. Collected information about poets & Authors like Triveni, Su. Ram Ekkundi, P Lankesh.