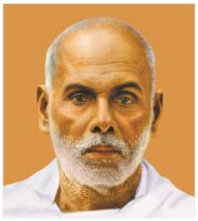
Sree Narayana Guru College
of Engineering & Technology
CHALAKKODE P.O., KOROM, PAYYANUR, KANNUR-670 307



COs OF MECHANICAL ENGINEERING DEPARTMENT

Sree Narayana Guru College of Engineering & Technology

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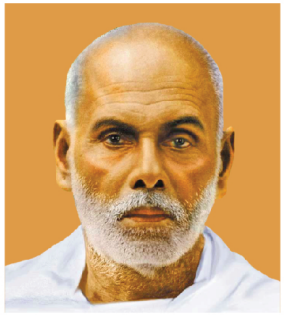
Est. 2003



SEMESTER	SUBJECT CODE	SUBJECT NAME	CO	COURSE OUTCOMES
S1&S2	MAT101	LINEAR ALGEBRA AND CALCULUS	CO I	Solve the consistent system of linear equations and apply orthogonal to a quadratic form
			CO II	Find the maxima and minima of multivariable functions
			COIII	Find areas and volumes of geometrical shapes, mass and centre of gravity of plane laminas using double and triple integrals
			CO IV	Perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent
			CO V	Determine the power series expansion of a given function
S1&S2	EST100	ENGINEERING MECHANICS	CO I	Construct free body diagram and calculate the reactions necessary to ensure static equilibrium.
			CO II	Study the effect of friction in static and dynamic conditions.
			COIII	Understand the different properties of surfaces in relation to moment of inertia
			CO IV	Analyse and solve different problems of kinematics and kinetics.
			CO V	Analyse and solve with and without damping of SODF.

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S1&S2	EST130	BASICS OF ELECTRICAL AND ELECTRONICS	CO I	Apply fundamental concepts and circuit laws to solve simple DC electric circuits
			CO II	Develop and solve models of magnetic circuits
			COIII	Apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state
			CO IV	Describe working of a voltage amplifier
			CO V	Outline the principle of an electronic instrumentation system
			CO VI	Explain the principle of radio and cellular communication

S1&S2	CYT100	ENGINEERING CHEMISTRY	CO I	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields.
			CO II	Understand various spectrocopic techniques like uv-visible, ir, nmr and its applications
			COIII	Apply the knowledge of analytical method for characterising a chemical mixture or a compound. Understand the basic concept of sem for surface characterisation of nanomaterials.
			CO IV	Learn about the basic of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering.
			CO V	Study various types of water treatment methods to develop skills for treating wastewater

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SEMESTER	SUBJECT CODE	SUBJECT NAME	CO	COURSE OUTCOMES
S1&S2	PHT100	ENGINEERING PHYSICS	CO I	Compute the quantitative aspects of waves and oscillations in engineering systems.
			CO II	Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments.
			COIII	Analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices.
			CO IV	Classify the properties of magnetic materials and apply vector calculus to static magnetic fields and use Maxwell's equations to diverse engineering problems
			CO V	Analyze the principles behind various superconducting applications, explain the working of solid state lighting devices and fibre optic communication system
S1&S2	HUN101	LIFE SKILLS	CO I	Define and Identify different life skills required in personal and professional life.
			CO II	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.
			COIII	Explain the basic mechanics of effective communication and demonstrate these through presentations.
			CO IV	Take part in group discussion.

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			CO V	Use appropriate thinking and problem solving techniques to solve new problem.
			CO VI	Understanding the basics of teamwork and leadership.
S1&S2	CYL100	ENGINEERING CHEMISTRY LAB	CO I	Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses
			CO II	Develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs
			COIII	Develop the ability to understand and explain the use of modern spectroscopic techniques for analysing and interpreting the IR spectra and NMR spectra of some organic compounds
			CO IV	Acquire the ability to understand, explain and use instrumental techniques for chemical analysis
			CO V	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments
			CO VI	Function as a member of a team, communicate effectively and engage in further learning. Also understand how chemistry addresses social, economical and environmental problems and why it is an integral part of curriculum

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SEMESTER	SUBJECT CODE	SUBJECT NAME	CO	COURSE OUTCOMES
S1&S2	PHL100	ENGINEERING PHYSICS LAB	CO I	Develop analytical/experimental skills and impart prerequisite hands on experience for engineering laboratories
			CO II	Understand the need for precise measurement practices for data recording
			COIII	Understand the principle, concept, working and applications of relevant technologies and comparison of results with theoretical calculations
			CO IV	Analyze the techniques and skills associated with modern scientific tools such as lasers and fiber optics
			CO V	Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results

SEMESTER	SUBJECT CODE	SUBJECT NAME	CO	COURSE OUTCOMES
S1&S2	MAT102	VECTOR CALCULUS DIFFERENTIAL EQUATIONS AND TRANSFORMS	CO I	Compute the derivatives and line integrals of vector functions and learn their applications
			CO II	Evaluate surface and volume integrals and learn their inter-relations and applications.
			COIII	Solve homogeneous and non-homogeneous linear differential equation with constant coefficient
			CO IV	Compute Laplace transform and apply them to solve odes arising in engineering
			CO V	Determine the Fourier transforms of functions and apply them to solve problems arising in engineering

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S1&S2	MAT102	VECTOR CALCULUS DIFFERENTIAL EQUATIONS AND TRANSFORMS	CO I	Compute the derivatives and line integrals of vector functions and learn their applications
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SEMESTER	SUBJECT CODE	SUBJECT NAME	CO	COURSE OUTCOMES
S3	MET 201	MECHANICS OF SOLIDS	CO I	Determine the stresses, strains and displacements of structures by tensorial and graphical (Mohr's circle) approaches
			CO II	Analyse the strength of materials using stress-strain relationships for structural and thermal loading
			COIII	Perform basic design of shafts subjected to torsional loading and analyse beams subjected to bending moments
			CO IV	Determine the deformation of structures subjected to various loading conditions using strain energy methods
			CO V	Analyse column buckling and appreciate the theories of failures and its relevance in engineering design

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S3	MET 203	MECHANICS OF FLUIDS	CO I	Define Properties of Fluids and Solve hydrostatic problems
			CO II	Explain fluid kinematics and Classify fluid flows
			CO III	Interpret Euler and Navier-Stokes equations and Solve problems using Bernoulli's equation
			CO IV	Evaluate energy loses in pipes and sketch energy gradient lines
			CO V	Explain the concept of boundary layer and its applications
			CO VI	Use dimensional Analysis for model studies
S3	MET205	METALLURGY & MATERIAL SCIENCE	CO I	Understand the basic chemical bonds, crystal structures (BCC, FCC, and HCP), and their relationship with the properties.
			CO II	Analyze the microstructure of metallic materials using phase diagrams and modify the microstructure and properties using different heat treatments.
			CO III	How to quantify mechanical integrity and failure in materials.
			CO	Apply the basic principles of ferrous and non-ferrous

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			IV	metallurgy for selecting materials for specific applications.
			CO V	Define and differentiate engineering materials on the basis of structure and properties for engineering applications.
S3	MEL201	COMPUTER AIDED MACHINE DRAWING	CO I	Apply the knowledge of engineering drawings and standards to prepare standard dimensioned drawings of machine parts and other engineering components.
			CO II	Prepare standard assembly drawings of machine components and valvesusing part drawings and bill of materials.
			COIII	Apply limits and tolerances to components and choose appropriate fits for given assemblies
			CO IV	Interpret the symbols of welded, machining and surface roughness on the component drawings.
			CO V	Prepare part and assembly drawings and Bill of Materials of machine components and valves using CAD software.

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S3	MET203	MATERIALS TESTING LAB	CO I	To understand the basic concepts of analysis of circular shafts subjected to torsion.
			CO II	To understand the behaviour of engineering component subjected to cyclic loading and failure concepts
			CO III	Evaluate the strength of ductile and brittle materials subjected to compressive, Tensile shear and bending forces
			CO IV	Evaluate the microstructural morphology of ductile or brittle materials and its fracture modes (ductile /brittle fracture) during tension test
			CO V	To specify suitable material for applications in the field of design and manufacturing.

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SEMESTER	SUBJECT CODE	SUBJECT NAME	CO	COURSE OUTCOMES
S4	MET 202	ENGINEERING THERMODYNAMICS	CO I	Understand basic concepts and laws of thermodynamics
			CO II	Conduct first law analysis of open and closed systems
			CO III	Determine entropy and availability changes associated with different processes
			CO IV	Understand the application and limitations of different equations of state
			CO V	Determine change in properties of pure substances during phase change processes
S4	MET204	MANUFACTURING PROCESS	CO I	Illustrate the basic principles of foundry practices and special casting processes, their advantages, limitations and applications
			CO II	Categorize welding processes according to welding principle and material.
			CO III	Understand requirements to achieve sound welded joint while welding different similar and dissimilar engineering materials.
			CO IV	Student will estimate the working loads for pressing, forging, wire

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				drawing etc.
			CO V	Recommend appropriate part manufacturing processes when provided a set of functional requirements and product development constraints.
S4	MET 206	FLUID MACHINERY	CO I	Explain the characteristics of centrifugal and reciprocating pumps
			CO II	Calculate forces and work done by a jet on fixed or moving plate and curved plates
			CO III	Explain the working of turbines and Select a turbine for specific application.
			CO IV	Analyse the working of air compressors and Select the suitable one based on application.
			CO V	Analyse gas turbines and Identify the improvements in basic gas turbine cycles.
			CO II	Calibrate flow measuring devices (notches, orifice meter and Venturi meter)
			CO III	Evaluate the losses in pipes
			CO IV	Determine the metacentric height and stability of floating bodies
			CO V	Determine the efficiency and plot the characteristic curves of different types of pumps and turbines

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S4	MEL 204	MACHINE TOOLS LAB- I	CO I	The students can operate different machine tools with understanding of work holders and operating principles to produce different part features to the desired quality.
			CO II	Apply cutting mechanics to metal machining based on cutting force and power consumption.
			CO III	Select appropriate machining processes and process parameters for different metals.
			CO IV	Fabricate and assemble various metal components by welding and students will be able to visually examine their work and that of others for discontinuities and defects.
			CO V	Infer the changes in properties of steel on annealing, normalizing, hardening and tempering.

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SEMESTER	SUBJECT CODE	SUBJECT NAME	CO	COURSE OUTCOMES
S5	MET301	MECHANICS OF MACHINERY	CO I	Explain the fundamentals of kinematics, various planar mechanisms and interpret the basic principles of mechanisms and machines
			CO II	Perform analysis and synthesis of mechanisms
			COIII	Solve the problem on cams and gear drives, including selection depending on requirement.
			CO IV	Calculate the gyroscopic effect in various situations
			CO V	Analyse rotating and reciprocating masses for its unbalance
			CO II	Discuss the working of steam turbines and methods for evaluating the performance
			COIII	Illustrate the performance testing and evaluation of IC engines
			CO IV	Explain the combustion phenomenon and pollution in IC engines
			CO V	Discuss the principles of refrigeration and air-conditioning and basic design considerations

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S5	MET 305	INDUSTRIAL & SYSTEMS ENGINEERING	CO I	Implement various tools and techniques in industrial engineering
			CO II	Calculate the inventory system for a given requirement
			COIII	Explain the importance of industrial relations
			CO IV	Select the lean manufacturing tools to find and eliminate wastes
			CO V	Identify the framework of agile manufacturing
			CO VI	Identify core and extended modules of enterprise resource planning

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S5	MET 307	MACHINE TOOLS AND METROLOGY	CO I	Analyze various machining process and calculate relevant quantities such us velocities, forces and powers.
			CO II	Analyze of the tool nomenclature with surface roughness obtainable in each machining processes.
			CO III	Understand the limitations of various machining process with regard to shape formation and surface texture.
			CO IV	Demonstrate knowledge of the underlying principles of measurement, as they relate to mechanical measurement, electronic instrumentation, and thermal effects.
			CO V	Get an exposure to advanced measuring devices and machine tool metrology.
S5	MEL331	MACHINE TOOLS LAB II	CO I	Apply the procedures to measure length, angles, width, depth, bore diameters, internal and external tapers, tool angles, and surface roughness by using different instruments and by different indirect methods.
			CO II	Determine limits and fits and allocate tolerances for machine components
			CO III	CNC programming and to use coordinate measuring machine to record measurements of complex profiles with high sensitivity.
			CO IV	Use effective methods of measuring straightness, Squareness, flatness, roundness, profile, screw threads and gear teeth.
			CO V	Securing knowledge of manufacturing components within the tolerance limit and surface roughness according to given drawings using various machine tools.

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S5	MEL 333	THERMAL ENGINEERING LAB 1	CO I	Measure thermo-physical properties of solid, liquid and gaseous fuels
			CO II	Identify various systems and subsystems of Diesel and petrol engines
			CO III	Analyse the performance characteristics of internal combustion engines
			CO IV	Investigate the emission characteristics of exhaust gases from IC Engines
			CO V	Interpret the performance characteristics of air compressors / blowers

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SEMESTER	SUBJECT CODE	SUBJECT NAME	CO	COURSE OUTCOMES
S6	MET 302	HEAT &MASS TRANSFER	CO I	Apply principles of heat and mass transfer to engineering problems
			CO II	Analyse and obtain solutions to problems involving various modes of heat transfer
			COIII	Design heat transfer systems such as heat exchangers, fins, radiation shields etc.
			CO IV	Define laminar and turbulent boundary layers and ability to formulate energy equation in flow systems.
S6	MET304	DYNAMICS AND DESIGN OF MACHINERY	CO I	Do engine force analysis and to draw turning moment diagrams
			CO II	Analyse free and forced vibrations of single degree of freedom systems
			COIII	Determine the natural frequencies of a two degree of freedom vibrating system and to calculate the stresses in a structural member due to combined loading
			CO IV	Design machine elements subjected to fatigue loading and riveted joints

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S6	MET 306	ADVANCED MANUFACTURING ENGINEERING	CO I	To be conversant with the advanced machining process and to appreciate the effect of process parameters on the surface integrity aspects during the advanced machining process.
			CO II	CNC programming, select appropriate tooling and fixtures.
			COIII	To categorize the various nontraditional material removal process based on energy sources and mechanism employed.
			CO IV	Analyze the processes and evaluate the role of each process parameter during micro machining of various advanced material removal processes.
			CO V	Explain the processes used in additive manufacturing for a range of materials and applications.
S6	MET308	COMPREHENSIVE COURSE WORK	CO I	Learn to prepare for a competitive examination
			COIII	Comprehend the questions in Mechanical Engineering field and answer them with confidence
			CO IV	Communicate effectively with faculty in scholarly environments
			CO V	Analyze the comprehensive knowledge gained in basic courses in the field

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S6	MEL 332	COMPUTER AIDED DESIGN & ANALYSIS LAB	CO I	Gain working knowledge in Computer Aided Design and modelling procedures.
			CO II	Gain knowledge in creating solid machinery parts.
			COIII	Gain knowledge in assembling machine elements.
			CO IV	Gain working knowledge in Finite Element Analysis.
			CO V	Solve simple structural, heat and fluid flow problems using standard software
S6	MEL334	THERMAL ENGINEERING LAB-II	CO I	Evaluate thermal properties of materials in conduction, convection and radiation
			CO II	Analyse the performance of heat exchangers
			COIII	Illustrate the operational performances of refrigeration and air conditioning systems
			CO IV	Perform calibration of thermocouples and pressure gauges
S6	MET312	NON DESTRUCTIVE TESTING	CO I	Have a basic knowledge of surface NDT which enables to carry out various inspections in accordance with the established procedures.
			CO II	The students will be able to differentiate various defect types and select the appropriateNDT methods for the specimen.

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			CO III	Calibrate the instrument and evaluate the component for imperfections.
			CO IV	Have a basic knowledge of ultrasonic testing which enables them to perform inspection of samples.
			CO V	Have a complete theoretical and practical understanding of the radiographic testing, interpretation and evaluation.

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SEMESTER	SUBJECT CODE	SUBJECT NAME	CO	COURSE OUTCOMES
S7	MET401	DESIGN OF MACHINE ELEMENTS	CO I	Design shafts based on strength, rigidity and design for static and fatigue loads, design flat belts and connecting rod of IC engines
			CO II	Design clutches and brakes
			COIII	Analyse sliding contact bearings and understand design procedure of journal, ball and roller bearings.
			CO IV	Design Spur gear and helical gear
			CO V	Design Bevel gears and worm gears
S7	MEL411	MECHANICAL ENGINEERING LAB	CO I	Get practical knowledge on design and analysis of mechanisms in the machines.
			CO II	Measure the cutting forces associated with milling machining operations.
			COIII	Apply the basic concepts of hydraulic and pneumatic actuators and their applications in product and processes
			CO IV	Use appropriate systems for data acquisition and control of product and processes

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S7	MET413	ADVANCED METHODS IN NON DESTRUCTIVE TESTING	CO I	Understand the theoretical and practical knowledge in methods of non-destructive testing processes
			CO II	Understand the knowledge of advanced methods in ultrasonic testing which enables them to perform inspection of samples.
			COIII	Illustrate complete theoretical and practical understanding of the radiographic testing, interpretation and evaluation.
			CO IV	Understand the recent advances in the field of non-destructive testing
			CO V	Outline the recent and advanced developments in radiography testing
S7	MET458	ADVANCED ENERGY ENGINEERING	CO II	Describe the theories of accident causation and preventive measures of industrial accidents.
			COIII	Explain about personal protective equipment, its selection, safety performance & indicators and importance of housekeeping.
			CO IV	Explain different issues in construction industries.
			CO V	Describe various hazards associated with different machines and mechanical material handling.

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S7	CST415	INTRODUCTION TO MOBILE COMPUTING	CO I	Describe the mobile computing applications, services, design considerations and architectures
			CO II	Identify the technology trends for cellular wireless networks
			COIII	Summarize the Short Messaging Service and General Packet Radio Service
			CO IV	Outline the LAN technologies used in mobile communication
			CO V	Describe the security protocols and apply suitable security algorithm to secure the communication

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SEMESTER	SUBJECT CODE	SUBJECT NAME	CO	COURSE OUTCOMES
S8	MET402	MECHATRONICS	CO I	Explain the sensors and actuators used in mechatronics
			CO II	Design hydraulic and pneumatic circuits for automation.
			COIII	Explain the manufacturing processes used in MEMS
			CO IV	Demonstrate the various components of a CNC machine
			CO V	Create a PLC program
			CO VI	Explain the robotic sensors and vision system
S8	MET414	QUALITY MANAGEMENT QUALITY	CO I	To be conversant with important terms for quality management in organisations
			CO II	Have a complete theoretical and practical understanding of the contributions of Quality Gurus
			COIII	Demonstrate knowledge of the underlying principles of strategic quality management
			CO IV	Identify various human dimensions of TQM
			CO V	Implement different tools and techniques in TQM
			CO VI	Identify core and extended modules of ISO 9000 family of standards

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S8	MET466	TECHNOLOGY MANAGEMENT	CO I	Be conversant with important terms for technology management in organisations
			CO II	Explain the need of technology forecasting
			COIII	Understand the essence of technology acquisition
			CO IV	Describe the elements of technology strategy
			CO V	Outline the basics of innovation
			CO VI	Identify human factors in technology management
S8	MET458	ADVANCED ENERGY ENGINEERING	CO I	Explain the concept of various types of power generation
			CO II	Explain solar and wind power generation and its economics
			COIII	Explain biomass energy sources and its economics
			CO IV	Explain various renewable energy sources
			CO V	Explain environmental impacts of various energy generation
			CO I	Explain the concept of various types of power generation

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