



DNR COLLEGE OF ENGINEERING & TECHNOLOGY
BHIMAVARAM, W. G. Dist., A.P., PIN-534202
DEPARTMENT OF Mechanical Engineering

Program Name:	B.TECH-MECHANICAL ENGINEERING	Academic Year	2018-19
Regulation	R13	Class / Sem	IV/I

COURSE OUTCOMES (Cos):

Upon completion of the course, students will be able to:

Course code	CO Statement -Automobile Engineering	TAXONOMY LEVELS
CO3411.1	Understand various components in four-wheel automobile.	Understand
CO3411.2	Differentiate between different types of transmission systems used in automobile.	Understand
CO3411.3	Examine steering geometry and steering systems used in automobile.	Apply
CO3411.4	Interpret suspension, breaking and electrical systems in automobile.	Remember
CO3411.5	Understand various safety and emission control processes systems used in automobile.	Apply
CO3411.6	Practice engine service for different components in automobile.	Create

Course code	CO Statement-CAD/CAM	TAXONOMY LEVELS
CO3412.1	Express the concept of CAD/CAM/CIM and Other terminologies used in the Understand development and manufacturing of a product.	Understand
CO3412.2	Describe the mathematical basis in the technique of representation of Understand geometric entities including points, lines, and parametric curves, surfaces and solid	Understand
CO3412.3	Illustrate the part programming on various NC machines.	Analyse
CO3412.4	Express the concept of Group Technology, Flexible Manufacturing System.	Apply
CO3412.5	Describe the use of GT and CAPP for the product development	Understand
CO3412.6	Incorporate ergonomics, Identify the various elements and their activities in the Applying Computer Integrated Manufacturing Systems.	Analyse

Course code	CO Statement-Finite Element Methods	TAXONOMY LEVELS
CO3413.1	Implement numerical methods to formulate and solve axially loaded bar problems	Apply
CO3413.2	Understand to apply coordinate systems, boundary conditions, meshing and interpolation functions.	Understand
CO3413.3	Formulate and analyze truss and beams	Create
CO3413.4	Implement the formulation techniques to solve two-dimensional problems and Axi-symmetric three-dimensional problems using triangle elements	Apply
CO3413.5	Formulate and solve four noded quadrilateral iso-parametric elements and numerical integration.	Create
CO3413.6	Formulate and solve one-dimensional heat transfer problems, lumped matrices and free vibrations.	Create



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Course code	CO Statement- Unconventional Machining Process	TAXONOMY LEVELS
CO3414.1	Differentiation between convention and unconventional machining process	Understand
CO3414.2	Apply the general principles of electrochemical machining processes.	Apply
CO3414.3	Illustrate the thermal metal removal processes.	Apply
CO3414.4	Demonstrate the Electron and laser beam machining Processes	Apply
CO3414.5	Apply the plasma for metal removal processes for accuracy and surface finish	Apply
CO3414.6	Illustrate the various jet machining operations in industries.	Apply

Course code	CO Statement – Nano Technology	TAXONOMY LEVELS
CO3415B.1	Illustrate about nano structures materials and their applications	Apply
CO3415B.2	Apply knowledge about the nano crystalline material, their properties and defects	Apply
CO3415B.3	Justify various techniques of nano fabrication	Evalute
CO3415B.4	Apply the tools to characterize the nano materials	Apply
CO3415B.5	Apply Carbon nano technology for synthesis of diamonds and carbon nano tubes	Apply
CO3415B.6	Analyze the applications of nano materials	Analyse

Course code	CO Statement – Automation in manufacturing	TAXONOMY LEVELS
CO3416C.1	Illustrate the types and strategies and various components in Automated Systems	Apply
CO3416C.2	Solve the line balancing problems in the various flow line systems with and without use buffer storage.	Apply
CO3416C.3	Apply the concept of assembly system and line balancing	Apply
CO3416C.4	Demonstrate the different automated material handling, storage and retrieval systems.	Apply
CO3416C.5	Utilize the Adaptive Control principles and implement the same online inspection and control	Apply
CO3416C.6	Illustrate the methods of automated inspection methods	Apply

Course code	CO Statement – Simulation lab	TAXONOMY LEVELS
CO3417.1	Develop a part drawings for various components	Create
CO3417.2	Apply different commands to generate 3D models	Apply
CO3417.3	Design a simple 3D components for assembling	Create
CO3417.4	Determine the principle stresses and deflections in 2D and 3D components	Apply
CO3417.5	Apply harmonic and heat transfer analysis of plane and axisymmetric components	Apply
CO3417.6	Develop NC codes for free form and sculptured surfaces using CAM packages	Create



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Course code	CO Statement – Design / Fabrication Project	TAXONOMY LEVELS
CO3418.1	Identify right problem and come with abstract for the proposed problem.	Remember
CO3418.2	Build a prospective solution based on recent literature survey and data gathering.	Create
CO3418.3	Identify the various resources and components required to complete project.	Remember
CO3418.4	Solve the problem by creating a working model implementation or simulation study using a tool.	Apply
CO3418.5	Justify the project work progress to a panel of experts in the form of written report and presentation.	Evaluate
CO3418.6	Conduct Experimental or simulation studies and take observations, analyze and conclude the results.	Apply
CO3418.7	Develop a simulation model to apply a software tool to solve the problem	Create
CO3418.8	Fabricate a working model.	Analyse
CO3418.9	Prepare a thesis as per given university guidelines for the project taken up.	Create
CO3418.10	Plan the tasks required the for the project and split among team for execution and complete the project within the stipulated time.	Analyse
CO3418.11	Express the contribution towards the project as a team member while submitting the report.	Understand
CO3418.12	Participate in competitions or expos or technical publications to demonstrate the project outcomes.	Apply



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Regulation	R16	Class / Sem	III/I

COURSE OUTCOMES (Cos):

Upon completion of the course, students will be able to:

Course code	CO Statement -Dynamics of Machinery	TAXONOMY LEVELS
CO3311.1	Analyze the effect of a gyroscope on ships, aero planes and automobile	Analyse
CO3311.2	Explain the working of important machine elements like clutches, brakes, flywheels, governors	Understand
CO3311.3	Analyze the dynamic forces in slider crank mechanism and fluctuation of energy in fly wheels and their design.	Analyse
CO3311.4	Explain the working of Watt, porter and proell governors, spring loaded governors.	Understand
CO3311.5	Analyze the theory involved in balancing of rotating and reciprocating members and Estimate the unbalanced forces in a multi-cylinder reciprocating engine	Analyse
CO3311.6	Understand longitudinal, transverse and torsional vibrations so as to avoid resonance	Remember

Course code	CO Statement-Metal Cutting & Machine Tools	TAXONOMY LEVELS
CO3312.1	Apply cutting mechanics to metal machining based on cutting force and power consumption.	Apply
CO3312.2	Operate lathe, milling machines, drill press, grinding machines, etc.	Apply
CO3312.3	Select cutting tool materials and tool geometries for different metals	Analyse
CO3312.4	Select appropriate machining processes and conditions for different metals	Analyse
CO3312.5	Learn machining economics	Understand
CO3312.6	Design jigs and Fixtures for simple parts.	Create

Course code	CO Statement-Design of Machine Members–II	TAXONOMY LEVELS
CO3313.1	To understand and apply principles of gear design to spur gears and industrial spur gear boxes.	Apply
CO3313.2	To become proficient in Design of Helical and Bevel Gear	Create
CO3313.3	To develop capability to analyze Rolling contact bearing and its selection from manufacturer's Catalogue.	Create
CO3313.4	To learn a skill to design worm gear box for various industrial applications.	Create
CO3313.5	To inculcate an ability to design belt drives and selection of belt, rope and chain drives.	Create



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CO3313.6	To achieve an expertise in design of Sliding contact bearing in industrial applications.	Evalute
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Course code	CO Statement-Operations Research	TAXONOMY LEVELS
CO3314.1	Illustrate general Linear Programming problem.	Apply
CO3314.2	Find optimum solution for the Transportation problems.	Evalute
CO3314.3	Determine the optimal solution for Assignment problems.	Apply
CO3314.4	Determine the best strategy and value of the given game model.	Apply
CO3314.5	Identify replacement policy and general cost function	Apply
CO3314.6	Understand the need of inventory management	Understand

Course code	CO Statement –Thermal Engineering -II	TAXONOMY LEVELS
CO3315.1	Explain the working of Rankine cycle, get knowledge about fuels and their combustion	Undedrstand
CO3315.2	Classify the types of boilers, discuss their working, compare the draught systems	Analyse
CO3315.3	Describe the types and working and calculations of their performance in steam nozzles and steam turbines	Understand
CO3315.4	Discuss the types and working and analyzing the performance of steam condensers	Understand
CO3315.5	Explain the types and compare the working of gas turbines	Understand
CO3315.6	Explain the performance of different types of jets and rockets	Understand

Course code	CO Statement –Theory of Machines Lab	TAXONOMY LEVELS
CO3316.1	Relate to fundamental knowledge of dynamics of machines like dynamic balancing, flywheel analysis, gyroscopic forces and moments.	Remember
CO3316.2	Experiment with the velocity and acceleration concepts and the methodology using graphical methods and principles and application of four bar chain.	Analyse
CO3316.3	Analyze the applications of cams and their working principles.	Analyse
CO3316.4	Test vibrations and its significance on engineering design.	Apply
CO3316.5	Understand the applications of screw Jack mechanism	Understand
CO3316.6	Illustrate gears, power transmission through different types of gears including gear profiles	Apply

Course code	CO Statement –Machine Tools Lab	TAXONOMY LEVELS
CO3317.1	Demonstrate step turning and Taper turning operations on Lathe machine.	Apply
CO3317.2	Demonstrate knurling and thread cutting, drilling operations on lathe machine.	Apply
CO3317.3	Demonstrate drilling operations in drilling machine.	Apply
CO3317.4	Grove a key way on a work piece using shaping machine.	Create
CO3317.5	Demonstrate skills in slotting operations in slotter.	Apply
CO3317.6	Performing milling operation on gear wheel.	Apply



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Course code	CO Statement –Thermal Engineering Lab	TAXONOMY LEVELS
CO3318.1	Apply their knowledge to draw VTD & PTD of I.C Engines	Apply
CO3318.2	Calculate the friction power by using Morse, Retardation, Motoring tests in I.C Engines	Apply
CO3318.3	Conduct performance test, Heat balance test, Economical speed test in I.C Engines	Apply
CO3318.4	Conduct Performance test in Reciprocating Air compressor and conduct experiments for testing of fuels	Apply
CO3318.5	Explain the working of Steam Boilers, its mountings & accessories	Understand
CO3318.6	Show assembly and disassembly of 2-wheeler,3 wheeler,4 wheeler engines	Remember

Course code	CO Statement –IPR & Patents	TAXONOMY LEVELS
CO3319.1	Differentiate and explain various forms of IPRs.	Understand
CO3319.2	Identify criteria's to fit one's own intellectual work in particular form of IPRs	Remember
CO3319.3	Apply statutory provisions to protect particular form of IPRs	Apply
CO3319.4	Analyze rights and responsibilities of holder of patent, copyright, trademark, industrial design etc	Analyse
CO3319.5	Analyze rights and responsibilities of holder of patent, copyright, trademark, industrial design etc	Analyse
CO3319.6	Develop skill of making search using modern tools and techniques.	Create



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COURSE OUTCOMES (Cos):

Upon completion of the course, students will be able to:

Course code	CO Statement -Metallurgy & Materials Science	TAXONOMY LEVELS
CO3211.1	Analyze the Structure of materials at different levels, basic concepts of crystalline materials.	Analyse
CO3211.2	Identify the properties of metals with respect to crystal structure and grain size	Remember
CO3211.3	Interpret the phase diagrams of materials	Understand
CO3211.4	Classify and Distinguish different types of cast irons, steels and non ferrous alloys	Analyse
CO3211.5	Describe the concept of heat treatment of steels & strengthening mechanisms	Understand
CO3211.6	Explain the powder metallurgy process, types and manufacturing of composite materials	Understand

Course code	CO Statement-Mechanics of Solids	TAXONOMY LEVELS
CO3212.1	Analyze the given designed member is enough to resist the forces which it is subjected	Analyse
CO3212.2	Able to identify the serviceability requirements of designed structure member	Remember
CO3212.3	Determine the properties of given materials is acceptable to make sure that the design structure will remain serviceable and will not fail under applied loads with a suitable factor of safety	Apply
CO3212.4	It also teaches us how to make effective and economical use of engineering materials	Apply
CO3212.5	To analyze and design thin & thick cylinders	Analyse
CO3212.6	Analyze the different loads on buckling and stability	Analyse

Course code	CO Statement-Thermodynamics	TAXONOMY LEVELS
CO3213.1	Ability to apply various thermodynamics laws to real system	Apply
CO3213.2	Understanding of the entropy of system and ideal gas equations	Understand
CO3213.3	An understanding of the interrelationship between thermodynamic cycles	Understand
CO3213.4	Ability to use properties of pure substances in real thermodynamic problems	Apply
CO3213.5	An ability to relate the characteristics of steam generators	Remember
CO3213.6	An ability to relate the characteristics of psychometric	Remember



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Course code	CO Statement-Fluid Mechanics & Hydraulic Machines	TAXONOMY LEVELS
CO3214.1	Explain the effect of fluid properties on a flow system	Understand
CO3214.2	Identify type of fluid flow patterns and describe continuity equation.	Remember
CO3214.3	Analyze a variety of practical fluid flow and measuring devices and utilize Fluid Mechanics principles in design	Analyse
CO3214.4	Understand the concept of boundary layer theory and flow separation.	Understand
CO3214.5	Analyze an appropriate turbine with reference to given situation in power plants.	Analyse
CO3214.6	Estimate performance parameters and evaluation of a given Centrifugal and Reciprocating pump.	Evaluate

Course code	CO Statement-Computer Aided Engineering Drawing Practice	TAXONOMY LEVELS
CO3215.1	Improve their visualization skills	Apply
CO3215.2	Understand the theory of projection	Understand
CO3215.3	Make component drawings.	Create
CO3215.4	Make components of Iso-metric drawing	Create
CO3215.5	Produce the assembly drawings using part drawings.	Create
CO3215.6	Engage in lifelong learning using sketching and drawing as communication tool.	Create

Course code	CO Statement –Managerial Economics & Financial Analysis	TAXONOMY LEVELS
CO3216.1	Estimating the Demand and demand elasticities for a product	Evaluate
CO3216.2	Explain the Input -Output-Cost relationships and estimation of the least cost combination of inputs	Understand
CO3216.3	Understand the nature of different markets and determine price output determination under various market conditions	Understand
CO3216.4	Describe different Business Units, market structures, pricing strategies	Understand
CO3216.5	Formulate Financial Statements and the Usage of various accounting tools for Analysis	Create
CO3216.6	Evaluate various investment project proposals with the help of capital Budgeting techniques for decision making	Evaluate



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Course code	CO Statement –Electrical & Electronics Engineering Lab	TAXONOMY LEVELS
CO3217.1	Described find out the efficiency of dc shunt machine without actual loading of load conditions and power factors of single phase transformer with OC and SC test	Understand
CO3217.2	Analyze the performance characteristics and to determine efficiency of DC shunt motor & 3-phase induction motor	Analyse
CO3217.3	Described pre-determine the regulation of an alternator by synchronous impedance method	Understand
CO3217.4	Described control the speed of dc shunt motor using speed control methods	Understand
CO3217.5	Determine find out the characteristics of PN junction diode & transistor the ripple factor of half wave & full wave rectifiers	Apply
CO3217.6	Develop the capability to identify and select suitable DC motor / induction motor / special purpose motor and its speed control method for given industrial application.	Create

Course code	CO Statement –Mechanics of Solids & Metallurgy Lab	TAXONOMY LEVELS
CO3218.1	Understand basic concepts of stress, strain and their relations based on linear elasticity. Material behaviors due to different types of loading will be discussed	Understand
CO3218.2	Calculate stresses and deformation of a bar due to an axial loading under uniform and non-uniform conditions.	Apply
CO3218.3	Analyze and interpret laboratory data relating to behavior of structures and the materials they are made of, and undertake associated laboratory work individually and in teams.	Analyse
CO3218.4	Undertake problem identification, formulation and solution using a range of analytical methods. Calculate normal and shear stresses on any cross- section of a beam	Analyse
CO3218.5	Characterize the microstructures of different ferrous and non-ferrous metals.	Apply
CO3218.6	Identify the effect of heat treatment and cooling rates on the properties of steels	Remember



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COURSE OUTCOMES (Cos):

Upon completion of the course, students will be able to:

Course code	CO Statement -Production Planning and Control	TAXONOMY LEVELS
CO3421.1	Understand the role Production Planning and control activities in Manufacturing and Services.	Understand
CO3421.2	Understand and perform various Forecasting techniques and problems	Understand
CO3421.3	Understand and perform various Inventory Management techniques and apply in real manufacturing scenario/How to use MRP/ERP	Understand
CO3421.4	Demonstrate various Scheduling procedures/Balancing concepts	Apply
CO3421.5	Understand and Evaluate Dispatching procedures	Understand
CO3421.6	Describe way of integrating different departments to execute PPC functions	Understand

Course code	CO Statement-Green Engineering Systems	TAXONOMY LEVELS
CO3422.1	Differentiate the renewable and non-renewable sources of energy	Understand
CO3422.2	Examine the working principle of various solar energy systems	Apply
CO3422.3	Determine the applications of different renewable energy sources like ocean, wind thermal, hydro, geothermal energy etc	Apply
CO3422.4	Assess different energy sources in their ability to deliver clean and reliable electricity and heating/cooling utilities.	Analyse
CO3422.5	Illustrate basic principles of green engineering applied to product design and manufacturing processes.	Apply
CO3422.6	Learn to modify processes and products to make them green safe and economically acceptable.	Understand

Course code	CO Statement-Power Plant Engineering	TAXONOMY LEVELS
CO3423D.1	Demonstrate the various elements of working in Steam Power plant	Apply
CO3423D.2	Illustrate the lay out of diesel power plant with the explanation	Apply
CO3423D.3	Explain hydroelectric power plant and hydro projects	Understand
CO3423D.4	Demonstrate the nuclear power plant and sketch different types of nuclear reactors	Apply
CO3423D.5	Apply Hybrid technology to different types of power plants	Apply
CO3423D.6	Explain Environmental consideration occurred in power plants and analyze the plant economics	Understand



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Course code	CO Statement-Non-Destructive Evaluation	TAXONOMY LEVELS
CO3424B.1	Importance of different non-destructive techniques and underlying principles	Understand
CO3424B.2	Understand ultrasonic testing and apply its principles to find defects	Understand
CO3424B.3	Use the principles of Magnetic particle testing on different work pieces	Apply
CO3424B.4	Explain the process of Dye penetration tests	Understand
CO3424B.5	Apply the principles of Eddy Current testing to find defects	Apply
CO3424B.6	List the applications of Non-destructive testing in different industries.	Remember

Course code	CO Statement –Project	TAXONOMY LEVELS
CO3425.1	Identify right problem and come with abstract for the proposed problem.	Remember
CO3425.2	Build a prospective solution based on recent literature survey and data gathering.	Create
CO3425.3	Identify the various resources and components required to complete project.	Remember
CO3425.4	Solve the problem by creating a working model implementation or simulation study using a tool.	Apply
CO3425.5	Justify the project work progress to a panel of experts in the form of written report and presentation.	Evaluate
CO3425.6	Conduct Experimental or simulation studies and take observations, analyze and conclude the results.	Apply
CO3425.7	Develop a simulation model to apply a software tool to solve the problem	Create
CO3425.8	Fabricate a working model.	Understand
CO3425.9	Prepare a thesis as per given university guidelines for the project taken up.	Create
CO3425.10	Plan the tasks required the for the project and split among team for execution and complete the project within the stipulated time.	Evaluate
CO3425.11	Express the contribution towards the project as a team member while submitting the report.	Understand
CO3425.12	Participate in competitions or expos or technical publications to demonstrate the project outcomes.	Apply



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Upon completion of the course, students will be able to:

Course code	CO Statement -Metrology	TAXONOMY LEVELS
CO3321.1	Inspection of engineering parts with various precision instruments.	Apply
CO3321.2	Design of part, tolerances and fits.	Create
CO3321.3	Principles of measuring instruments and gauges and their uses.	Remember
CO3321.4	Evaluation and inspection of surface roughness.	Evalute
CO3321.5	Inspection of spur gear and thread elements.	Apply
CO3321.6	Machine tool testing to evaluate machine tool quality.	Evalute

Course code	CO Statement-Instrumentation & Control Systems	TAXONOMY LEVELS
CO3322.1	Identify the various measurements, instrumentation and control systems.	Apply
CO3322.2	Discuss different types of fundamentals and operating principle.	Analyse
CO3322.3	Understand the static and dynamic properties of the instrument	Understand
CO3322.4	Analyze the stress and strain measurements.	Analyse
CO3322.5	Analyze for errors so as to determine correction factors for each instrument.	Analyse
CO3322.6	Use of basic principles, work, benefits, drawbacks and applications of various control systems.	Apply

Course code	CO Statement-Refrigeration & Air-Conditioning	TAXONOMY LEVELS
CO3323.1	Illustrate the fundamental principles and applications of refrigeration and air conditioning system	Apply
CO3323.2	Obtain cooling capacity and coefficient of performance by conducting test on vapour compression refrigeration systems	Analyse
CO3323.3	Present the properties, applications and environmental issues of different refrigerants	Apply
CO3323.4	Obtain the concept of Steam Jet Refrigeration System	Analyse
CO3323.5	Calculate cooling load for air conditioning systems used for various	Apply
CO3323.6	Operate and analyze the refrigeration and air conditioning systems.	Apply



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Course code	CO Statement –Heat Transfer	TAXONOMY LEVELS
CO3324.1	Define and Explain modes of heat transfer and solve 1D heat conduction problems with and without heat generation	Remember
CO3324.2	Develop heat transfer relations for different fin configurations and solve 1D transient heat conduction problems	Create
CO3324.3	Distinguish hydrodynamic and thermal boundary layers formed on a flat plate and to do the related problems	Understand
CO3324.4	Analyze different correlations developed for the natural convection heat transfer	Analyse
CO3324.5	Discuss various regimes of pool boiling and condensation heat transfer ,classify and analyze different heat exchangers	Understand
CO3324.6	State and Discuss various laws of radiation heat transfer.	Understand

Course code	CO Statement-Green Engineering System	TAXONOMY LEVELS
CO332D.1	Differentiate the renewable and non-renewable sources of energy	Understand
CO332D.2	Examine the working principle of various solar energy systems	Apply
CO332D.3	Determine the applications of different renewable energy sources like ocean, wind thermal, hydro, geothermal energy etc	Apply
CO332D.4	Assess different energy sources in their ability to deliver clean and reliable electricity and heating/cooling utilities.	Apply
CO332D.5	Illustrate basic principles of green engineering applied to product design and manufacturing processes.	Apply
CO332D.6	Learn to modify processes and products to make them green safe and economically acceptable.	Remember

Course code	CO Statement –Heat Transfer Laboratory	TAXONOMY LEVELS
CO3326.1	Estimate heat transfer coefficients in forced convection, free convection, condensation and Correlate with theoretical values.	Evaluate
CO3326.2	Determine surface emissivity of a test plate.	Apply
CO3326.3	Calculate temperature distribution of steady and transient heat conduction through plane wall, cylinder and fin using numerical approach.	Apply
CO3326.4	Conduct experiments to determine convective heat transfer coefficient for free and forced convection and correlate with theoretical values.	Apply
CO3326.5	Perform experiments to determine the thermal conductivity of a metal rod, Solar cell.	Apply



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CO3326.6	Perform Experiment To Determine The Overall Heat Transfer Coefficient In Heat Exchanger.	Apply
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Course code	CO Statement –Metrology & Instrumentation Laboratory	TAXONOMY LEVELS
CO3327.1	Develop quality standards of engineering products in industries.	Create
CO3327.2	Demonstrate work in quality control departments of industries and to ensure quality of products.	Apply
CO3327.3	Analyze the measurement of the surface roughness and perform alignment tests.	Analyse
CO3327.4	Develop the ability to apply the principles in instruments and measuring techniques.	Create
CO3327.5	Demonstrate work in designing the instrumentation for a particular purpose and special purpose devices	Apply
CO3327.6	Evaluate the surface quality of a given specimen which is important in all kind of manufacturing.	Evaluate

Course code	CO Statement –Computational Fluid Dynamics Laboratory	TAXONOMY LEVELS
CO3328.1	Develop mathematical models for flow phenomena.	Create
CO3328.2	Analyze mathematical and computational methods for fluid flow and heat transfer simulations.	Analyse
CO3328.3	Solve computational problems related to fluid flows and heat transfer.	Apply
CO3328.4	Evaluate the grid sensitivity and analyze the accuracy of a numerical solution.	Evaluate
CO3328.5	Evaluate flow parameters in internal and external flows.	Evaluate
CO3328.6	Develop flow simulation code for fluid flow and heat transfer problems.	Create

Course code	CO Statement –Professional Ethics & Human Values.	TAXONOMY LEVELS
CO3329.1	Recollect the human, moral values and ethics.	Remember
CO3329.2	Illustrate the principles to being harmony among I, we and nature by focusing on human duties, rights, and dignity.	Apply
CO3329.3	Describe the various Engineering Ethics and social issues that are encountered by every professional in discharging professional duties.	Understand
CO3329.4	Describe the Engineers' Responsibilities towards Safety and Risk and based on this make analysis on designing to keep safety measure.	Understand
CO3329.5	Demonstrate the professional ethics and techniques for collegiality and problem solving?	Apply
CO3329.6	Discuss the globalization and MNC issues like – cross culture , business ethics and research ethics etc.	Understand



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Upon completion of the course, students will be able to:

Course code	CO Statement-Kinematics Of Machinery	TAXONOMY LEVELS
CO3221.1	Define the purpose of kinematics, Kinematic joint and mechanism	Remember
CO3221.2	Explain various mechanisms for straight line motion and their applications including steering mechanism.	Understand
CO3221.3	Make use of the velocity and acceleration concepts and the methodology using graphical methods and principles and application of four bar chain.	Apply
CO3221.4	Explain the theories involved in cams show the applications of cams and their working principles	Understand
CO3221.5	Analyze gears, power transmission through different types of gears including gear profiles and its efficiency.	Analyse
CO3221.6	Summarize merits and demerits of each drive and understand various power transmission mechanisms and methodologies and working principles.	Analyse

Course code	CO Statement-Thermal Engineering -I	TAXONOMY LEVELS
CO3222.1	Learn and understand the reasons and effects of various losses that occurs in the actual engine operation.	Understand
CO3222.2	Know the working of I.C Engines and functions of engine systems	Remember
CO3222.3	Discuss the combustion stages and knocking phenomenon in I.C Engines	Understand
CO3222.4	Make the student learn to perform testing on S.I and C.I Engines to do calculations of performance parameters	Understand
CO3222.5	Explain the working and analyze the performance of Gas Turbines	Understand
CO3222.6	Describe the working and analyze the performance of jets and Rockets	Understand

Course code	CO Statement –Production Technology	TAXONOMY LEVELS
CO3223.1	Illustrate the basic principles of foundry practices and special casting processes, their advantages, limitations and applications.	Apply



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CO3223.2	Categorize welding processes according to welding principle and material.	Apply
CO3223.3	Understand requirements to achieve sound welded joint while welding different similar and dissimilar engineering materials.	Understand
CO3223.4	Student will estimate the working loads for the processes like pressing, forging, wire drawing etc.	Evaluate
CO3223.5	Recommend appropriate part manufacturing processes when provided a set of functional requirements and product development constraints.	Apply
CO3223.6	Describe the modern machining processes	Understand

Course code	CO Statement-Design of Machine Members -I	TAXONOMY LEVELS
CO3224.1	Understand the design standards and codes to analyze the stresses induced in the various components having different cross-section based on the type of load and their direction.	Understand
CO3224.2	Design threaded fasteners subjected to static, dynamic and fatigue loading together with eccentric loads and to solve problems using factor of safety for different components.	Create
CO3224.3	Understand the Design and analyze the shafts subjected to fluctuating and combined loads, keys, as well as cotter and knuckle joints.	Understand
CO3224.4	Understand and design riveted joints, brackets and welded joints subjected to eccentric load and also to demonstrate the engineering solutions related to the design problems encountered.	Understand
CO3224.5	Analyze and design of coupling subjected to various loads	Analyse
CO3224.6	Analyze and design of springs subjected to various loads	Analyse

Course code	CO Statement –Machine Drawing	TAXONOMY LEVELS
CO3225.1	Draw different types of bearings and threads showing different components.	Create
CO3225.2	Apply limits and tolerances to assemblies and choose appropriate fits.	Apply
CO3225.3	Recognize machining and surface finish symbols.	Analyse
CO3225.4	Assemble components of a machine part and draw the sectional assembly drawing showing the dimensions of all the components of the assembly as per bill of materials.	Create
CO3225.5	Identify the national and international standards pertaining to machine drawing.	Understand
CO3225.6	Explain fastening arrangements such as welding, riveting the different styles of attachment for shaft.	Understand

Course code	CO Statement –Industrial Engineering and Management	TAXONOMY LEVELS
CO3226.1	To identify, formulate, and solve complex engineering problems by applying principles of industrial engineering and management.	Understand
CO3226.2	Apply the concepts & principles of management in real life industry.	Apply
CO3226.3	To understand the concepts of maintenance management	Understand



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CO3226.4	To understand and examine the concepts of work study in industrial setting.	Understand
CO3226.5	To interpret the application of statistics in quality control using SQC techniques	Apply
CO3226.6	To understand the key concepts and practices within the field of HRM	Understand

Course code	CO Statement –Fluid Mechanics & Hydraulic Machines Lab	TAXONOMY LEVELS
CO3227.1	Determine the coefficient of discharge of flow measuring devices (orifice meter and venturimeter)	Apply
CO3227.2	Calibrate flow measuring devices (orifice meter and venturimeter)	Apply
CO3227.3	Evaluate the losses in pipes	Evaluate
CO3227.4	Estimate performance parameters of a given centrifugal and reciprocating pump.	Evaluate
CO3227.5	Understand the characteristic curves of different types of pumps and turbines	Understand
CO3227.6	Estimate performance parameters of a given turbines	Evaluate

Course code	CO Statement –Production Technology Lab	TAXONOMY LEVELS
CO3228.1	Understand the Pattern design and making	Understand
CO3228.2	Set up the different casting techniques	Analyse
CO3228.3	Determine the properties of sand	Apply
CO3228.4	Demonstrate different welding techniques	Apply
CO3228.5	Understand Hydraulic press deep drawing and extrusion operation.	Understand
CO3228.6	Understand the Bending and other operation	Understand