



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	2021-22
Regulation	R16	Class / Sem	IV/I

COURSE OUTCOMES (Cos):

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

Course code	CO Statement - Mechatronics	TAXONOMY LEVEL
CO3411.1	Identify the different functions of the Mechatronic, sensors, actuators and control systems	Remember
CO3411.2	Explain the Mechatronics, hydraulic, pneumatic and electric systems.	Understand
CO3411.3	Illustrate different types of semiconductor electronic equipment, operational amplifiers and fluid systems.	Apply
CO3411.4	Summarize the functionality of the programmable logical controller.	Understand
CO3411.5	Uses of dynamic and analogous models.	Apply
CO3411.6	Describe the interface and data acquisition systems.	Understand

Course code	CO Statement-Finite Element Methods	TAXONOMY LEVEL
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	Apply
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 isoparametric elements and numerical integration.	Apply
CO3413.6	Formulate and solve one-dimensional heat transfer problems, lumped matrices and free vibrations.	Apply

Course code	CO Statement- Power Plant Engineering	TAXONOMY LEVEL
CO3414.1	Basic knowledge of Different types of Power Plants, site selection criteria of each one of them.	Apply
CO3414.2	Understanding of Thermal Power Plant Operation, turbine governing, different types of high pressure boilers including upper critical and supercharged boilers, Fluidized bed combustion systems.	Understand
CO3414.3	Design of chimney in thermal power plants, knowledge of cooling tower operation, numerical on surface condenser design.	Analyze
CO3414.4	Basic knowledge of Different types of Nuclear power plants including Pressurized water reactor, Boiling water reactor, gas cooled reactor, liquid metal fast breeder reactor.	Apply
CO3414.5	Understanding of Power Plant Economics, Energy Storage including compressed air Energy and pumped hydro etc.	Understand
CO3414.6	Discussing environmental and safety aspects of power plant operation	Understand



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Course code	CO Statement – Additive Manufacturing	TAXONOMY LEVEL
CO341C.1	Describe the basics of rapid manufacturing techniques in manufacturing	Understand
CO341C.2	Apply the liquid and solid based rapid prototyping system in suitable applications	Apply
CO341C.3	Apply powder based rapid prototyping system in suitable applications	Apply
CO341C.4	Solve different problems in STL file formats using different rapid prototyping software	Apply
CO341C.5	Explain and summarize typical rapid tooling processes for quick batch production of plastic and metal parts.	Understand
CO341C.6	Apply the new technologies in rapid prototyping for various applications	Apply

Course code	CO Statement – Advanced Materials	TAXONOMY LEVEL
CO341D.1	Explain various types of matrix and reinforced composites,	Understand
CO341D.2	Select the fiber compositions and polymer compositions with respect to manufacturing applications.	Analyze
CO341D.3	Demonstrate various advanced manufacturing methods.	Apply
CO341D.4	Examine the reduction of hooks law	Apply
CO341D.5	Illustrate the laminate and laminate codes	Apply
CO341D.6	Select suitable material for different applications.	Analyze

Course code	CO Statement – CAD/CAM Lab	TAXONOMY LEVEL
CO3417.1	Utilize standard software tools to create part, assemblies and check for clearances.	Apply
CO3417.2	Modify 2d drafting to 3d using modelling software.	Apply
CO3417.3	Summarize the modern control in manufacturing systems (Fanuc, siemens)	Understand
CO3417.4	Utilize the concepts of g and m codes and manual part programming for modern manufacturing technology.	Apply
CO3417.5	Utilize Capp in machining and turning center	Apply
CO3417.6	Apply modern tools in design, manufacture and planning	Apply

Course code	CO Statement –Mechatronics Lab	TAXONOMY LEVEL
CO3418.1	Identification of key elements of mechatronics system and its representation in terms of block diagram	Remember
CO3418.2	Understanding the concept of signal processing and use of interfacing systems such as ADC, DAC, digital I/O	Understand
CO3418.3	Interfacing of Sensors, Actuators using appropriate DAQ micro-controller	Apply
CO3418.4	Time and Frequency domain analysis of system model (for control application)	Apply
CO3418.5	PID control implementation on real time systems	Apply
CO3418.6	Development of PLC ladder programming and implementation of real-life system.	Apply

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Regulation	R19	Class / Sem	III/I
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COURSE OUTCOMES (Cos):

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

Course code	CO Statement -Dynamics of Machinery	TAXONOMY LEVEL
CO3311.1	Analyze the effect of a gyroscope on ships, aeroplanes and automobile	Analyze
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.	Analyze
CO3311.4	Demonstrate the working of Watt, porter and proell governors, spring loaded governors.	Apply
CO3311.5	Analyze the theory involved in balancing of rotating and reciprocating members and Estimate the unbalanced forces in a multi-cylinder reciprocating engine	Apply
CO3311.6	Understand longitudinal, transverse and torsional vibrations so as to avoid resonance	Apply

Course code	CO Statement-Design of Machine Members-II	TAXONOMY LEVEL
CO3312.1	To understand and apply principles of gear design to spur gears and industrial spur gear boxes.	Apply
CO3312.2	To become proficient in Design of Helical and Bevel Gear	Apply
CO3312.3	To develop capability to analyze Rolling contact bearing and its selection from manufacturer's Catalogue.	Analyze
CO3312.4	To learn a skill to design worm gear box for various industrial applications.	Apply
CO3312.5	To inculcate an ability to design belt drives and selection of belt, rope and chain drives.	Analyze
CO3312.6	To achieve an expertise in design of Sliding contact bearing in industrial applications.	Analyze

Course code	CO Statement-Mechanical Measurements & Metrology	TAXONOMY LEVEL
CO3313.1	Illustrate the construction and working principles of measuring instruments for measurement of displacement and speed and select appropriate instrument for a given application.	Apply
CO3313.2	Demonstrate the construction and working principles of measuring instruments for strain, force, Torque, power, acceleration and Vibration and select appropriate instrument for a given application	Apply
CO3313.3	Explain shaft basis system and Hole basis systems for fits and represent tolerances for a given fit as per the shaft basis system and Hole basis system and design limit gauges based on the tolerances for quality check in mass production.	Understand
CO3313.4	Apply methods for linear, angle and flatness measurements and select a suitable method and its relevant instrument for a given application.	Apply
CO3313.5	To measure the threads, gear tooth profiles, surface roughness and flatness using appropriate instruments and analyse the data.	Analyze
CO3313.6	To develop basic principles and devices involved in measuring surface textures.	Analyze



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Course code	CO Statement-Managerial Economics and Financial Accountancy	TAXONOMY LEVEL
CO3314.1	Estimating the Demand and demand elasticities for a product	Evaluate
CO3314.2	Explain the Input -Output-Cost relationships and estimation of the least cost combination of inputs	Understand
CO3314.3	Understand the nature of different markets and determine price output determination under various market conditions	Understand
CO3314.4	Illustrate the different Business Units, market structures, pricing strategies	Apply
CO3314.5	Formulate Financial Statements and the Usage of various accounting tools for Analysis	create
CO3314.6	Evaluate various investment project proposals with the help of capital Budgeting techniques for decision making	Evaluate

Course code	CO Statement –IC Engines & Gas turbines	TAXONOMY LEVEL
CO3315.1	Analyze the reasons and effects of various losses that occurs in the actual engine operation.	Analyze
CO3315.2	Demonstrate the working of I.C Engines and functions of engine systems	Apply
CO3315.3	Demonstrate the combustion stages and knocking phenomenon in I.C Engines	Apply
CO3315.4	Make the student learn to perform testing on S.I and C.I Engines to do calculations of performance parameters	Apply
CO3315.5	Explain the working and analyze the performance of Gas Turbines	Analyze
CO3315.6	Describe the working and analyze the performance of jets and Rockets	Analyze

Course code	CO Statement – Thermal Engineering Lab	TAXONOMY LEVEL
CO3316.1	Apply their knowledge to draw VTD & PTD of I.C Engines	Apply
CO3316.2	Calculate the friction power by using Morse, Retardation, motoring tests in I.C Engines	Apply
CO3316.3	Conduct performance test, Heat Balance test, Economical speed test in I.C Engines	Apply
CO3316.4	Conduct performance test in Reciprocating Air compressor and conduct experiments for testing of fuels	Apply
CO3316.5	Explain the working of Steam Boilers, its mountings and accessories	Understand
CO3316.6	Show assembly and disassembly of 2- wheeler, 3- wheeler and 4- wheelers	Apply



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Course code	CO Statement –Theory of Machines Lab	TAXONOMY LEVEL
CO3317.1	Relate to fundamental knowledge of dynamics of machines like dynamic balancing, flywheel analysis, gyroscopic forces and moments.	Apply
CO3317.2	Experiment with the velocity and acceleration concepts and the methodology using graphical methods and principles and application of four bar chain.	Apply
CO3317.3	Analyze the applications of cams and their working principles.	Analyze
CO3317.4	Test vibrations and its significance on engineering design.	Apply
CO3317.5	Understand the applications of screw Jack mechanism	Understand
CO3317.6	Illustrate gears, power transmission through different types of gears including gear profiles	Apply

Course code	CO Statement –Mechanical Measurement & Metrology Lab	TAXONOMY LEVEL
CO3318.1	Different instruments that are available for linear, angular	Apply
CO3318.2	Roundness and roughness measurements	Apply
CO3318.3	Select and use the appropriate measuring instrument	Analyze
CO3318.4	Inspection of precision linear, geometric forms,	Apply
CO3318.5	Calibration of various instruments for measuring pressure, temperature,	Understand
CO3318.6	Calibration of various instruments for displacement, speed, vibration etc.	Apply

Course code	CO Statement –Social Relevant Project	TAXONOMY LEVEL
CO3319.1	Identify right problem and come with abstract for the proposed problem.	Understand
CO3319.2	Build a prospective solution based on recent literature survey and data gathering.	Create
CO3319.3	Identify the various resources and components required to complete project.	Understand
CO3319.4	Develop a simulation model to apply a software tool to solve the problem	Apply
CO3319.5	Fabricate a working model.	Apply
CO3319.6	Prepare a thesis as per given university guidelines for the project taken up.	Apply



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Program Name:	B. TECH-MECHANICAL ENGINEERING	Academic Year	2021-22
Regulation	R20	Class / Sem	II/I

COURSE OUTCOMES (Cos):

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

Course code	CO Statement -Vector Calculus, Fourier Transforms And PDE	TAXONOMY LEVEL
CO3211.1	Calculate directional derivative and gradient.	Apply
CO3211.2	Explain the concept of greens, strokes and gauss divergence theorem.	Understand
CO3211.3	Apply the Laplace transform for solving ordinary differential equations.	Apply
CO3211.4	Understand the concept of Fourier series expansion.	Understand
CO3211.5	Solve the sine and cosine transforms.	Apply
CO3211.6	Discuss partial differential equations of both first and second order.	Apply

Course code	CO Statement-Mechanics Of Solids	TAXONOMY LEVEL
CO3212.1	Compute the fundamentals of stress and strain concepts	Apply
CO3212.2	Calculate stresses and deformations in beams subjected to different loadings	Apply
CO3212.3	Estimate the effect of torsion in shafts and springs	Evaluate
CO3212.4	Calculate the deflection in beam	Apply
CO3212.5	Calculate the stresses and strains associated with thin and thick cylinder	Apply
CO3212.6	Compare the deformation in members subjected to axial, flexural and torsional loads	Analyze

Course code	CO Statement-Fluid Mechanics & Hydraulic Machines	TAXONOMY LEVEL
CO3213.1	Explain the effect of fluid properties on a flow system	Apply
CO3213.2	Illustrate the fluid flow patterns and describe continuity equation.	Apply
CO3213.3	Analyze a variety of practical fluid flow and measuring devices and utilize Fluid Mechanics principles in design	Analyze
CO3213.4	Analyze the concept of boundary layer theory and flow separation.	Analyze
CO3213.5	Analyze an appropriate turbine with reference to given situation in power plants.	Analyze
CO3213.6	Estimate performance parameters and evaluation of a given Centrifugal and Reciprocating pump.	Evaluate



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Course code	CO Statement-Production Technology	TAXONOMY LEVEL
CO3214.1	Illustrate the basic principles of foundry practices and special casting processes, their advantages, limitations and applications.	Apply
CO3214.2	Categorize welding processes according to welding principle and material.	Analyze
CO3214.3	Understand requirements to achieve sound welded joint while welding different similar and dissimilar engineering materials.	Understand
CO3214.4	Estimate the working loads for the processes like pressing, forging, wire drawing etc.	Evaluate
CO3214.5	Recommend appropriate part manufacturing processes when provided a set of functional requirements and product development constraints.	Evaluate
CO3214.6	Describe the modern machining processes	Understand

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Course code	CO Statement –Kinematics Of Machinery	TAXONOMY LEVEL
CO3215.1	Define the purpose of kinematics, Kinematic joint and mechanism	Apply
CO3215.2	Explain various mechanisms for straight line motion and their applications including steering mechanism.	Analyze
CO3215.3	Make use of the velocity and acceleration concepts and the methodology using graphical methods and principles and application of four bar chain.	Understand
CO3215.4	Explain the theories involved in cams show the applications of cams and their working principles	Evaluate
CO3215.5	Analyze gears, power transmission through different types of gears including gear profiles and its efficiency.	Evaluate
CO3215.6	Summarize merits and demerits of each drive and understand various power transmission mechanisms and methodologies and working principles.	Understand

Course code	CO Statement – Computer Aided Engineering Drawing Practice	TAXONOMY LEVEL
CO3216.1	Improve their visualization skills	Apply
CO3216.2	Understand the theory of projection	Understand
CO3216.3	Make component drawings.	Apply
CO3216.4	Make components of Iso-metric drawing	Apply
CO3216.5	Produce the assembly drawings using part drawings.	Apply
CO3216.6	Engage in lifelong learning using sketching and drawing as communication tool.	Apply

Course code	CO Statement –Fluid Mechanics & Hydraulic Machines Lab	TAXONOMY LEVEL
CO3217.1	Determine the coefficient of discharge of flow measuring devices (orifice meter and venturi meter)	Apply
CO3217.2	Calibrate flow measuring devices (orifice meter and venturi meter)	Apply
CO3217.3	Evaluate the losses in pipes	Evaluate
CO3217.4	Estimate performance parameters of a given centrifugal and reciprocating pump.	Apply
CO3217.5	Understand the characteristic curves of different types of pumps and turbines	Understand
CO3217.6	Estimate performance parameters of a given turbines	Apply



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Course code	CO Statement –Production Technology Lab	TAXONOMY LEVEL
CO3218.1	Understand the Pattern design and making	Understand
CO3218.2	Set up the different casting techniques	Apply
CO3218.3	Determine the properties of sand	Apply
CO3218.4	Demonstrate different welding techniques	Apply
CO3218.5	Understand Hydraulic press deep drawing and extrusion operation.	Understand
CO3218.6	Understand the Bending and other operation	Understand

Course code	CO Statement –Drafting and Modeling Lab	TAXONOMY LEVEL
CO3219.1	Development of part drawings for various components in the form of orthographic and isometric	Apply
CO3219.2	Representation of dimensioning and tolerances, Study of DXE, IGES files.	Apply
CO3219.3	Generation of various Surfaces using surface modeling	Create
CO3219.4	Generation of various 3D models through Pad, revolve, shell, sweep	Create
CO3219.5	Generation of various Parts/assemblies: like Screw Jack, Oldham's Coupling	Create
CO3219.6	Generation of various Parts/assemblies: Foot step bearing, Couplings, knuckle and cotter joints, Crankshaft, Connecting Rod, Piston and Cylinder by any 3D software package	Create

Course code	CO Statement –Essence of Indian Traditional Knowledge	TAXONOMY LEVEL
CO32110.1	Identify the concept of Basic knowledge of Traditional knowledge and its importance to develop the physical and social changes.	Understand
CO32110.2	Distinguish the importance of protecting traditional knowledge to communicate the traditional knowledge information.	Understand
CO32110.3	Illustrate the various enactments related to the protection of traditional knowledge.	Apply
CO32110.4	Interpret the concepts of Intellectual property to protect (IPR) the traditional knowledge.	Apply
CO32110.5	Explain the importance of Traditional knowledge in Agriculture and Medicine.	Understand
CO32110.6	Examine the sustainability and development of environment for standardizing the food security and traditional knowledge of the country.	Apply



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Program Name:	B.TECH-MECHANICAL ENGINEERING	Academic Year	2021-22
Regulation	R16	Class / Sem	IV/II

COURSE OUTCOMES (Cos):

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

Course code	CO Statement -Production Planning and Control	TAXONOMY LEVEL
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	Evaluate
CO3421.6	Describe way of integrating different departments to execute PPC functions	Understand

Course code	CO Statement-Unconventional Machining Processes	TAXONOMY LEVEL
CO3422.1	Differentiation between convention and unconventional machining process	Understand
CO3422.2	Determine the principle of working, mechanism of metal removal in the various unconventional machining process	Apply
CO3422.3	Describe the process parameters, their effect and applications of different processes.	Understand
CO3422.4	Demonstrate the Electrical energy based unconventional machining process.	Apply
CO3422.5	Demonstrate the Thermal energy based unconventional machining processes.	Apply
CO3422.6	Compare the concept of machining hard materials using chemical energy and electro chemical energy	Analyze

Course code	CO Statement-Automobile Engineering	TAXONOMY LEVEL
CO3423.1	Understand various components in four-wheel automobile.	Understand
CO3423.2	Differentiate between different types of transmission systems used in automobile.	Understand
CO3423.3	Examine steering geometry and steering systems used in automobile.	Apply
CO3423.4	Interpret suspension, breaking and electrical systems in automobile.	Apply
CO3423.5	Understand various safety and emission control processes systems used in automobile.	Understand
CO3423.6	Practice engine service for different components in automobile.	Apply



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Course code	CO Statement-Non-Destructive Evaluation	TAXONOMY LEVEL
CO342B.1	Importance of different non-destructive techniques and underlying principles	Apply
CO342B.2	Understand ultrasonic testing and apply its principles to find defects	Understand
CO342B.3	Use the principles of Magnetic particle testing on different work pieces	Apply
CO342B.4	Explain the process of Dye penetration tests	Understand
CO342B.5	Apply the principles of Eddy Current testing to find defects	Apply
CO342B.6	Demonstrate the applications of Non-destructive testing in different industries.	Apply

Course code	CO Statement –Seminar	TAXONOMY LEVEL
CO3425.1	Knew the advances in the areas of mechanical engineering	Understand
CO3425.2	Ability to collect the technical data	Apply
CO3425.3	Analyze data based on literature survey	Apply
CO3425.4	Ability to develop the oral and written presentation skills.	Create
CO3425.5	Knew the concept of novelty of work	Apply
CO3425.6	Develop technical writing skills	Create

Course code	CO Statement –Project	TAXONOMY LEVEL
CO3426.1	Identify right problem and come with abstract for the proposed problem.	Understand
CO3426.2	Build a prospective solution based on recent literature survey and data gathering.	Create
CO3426.3	Identify the various resources and components required to complete project.	Understand
CO3426.4	Solve the problem by creating a working model implementation or simulation study using a tool.	Apply
CO3426.5	Justify the project work progress to a panel of experts in the form of written report and presentation.	Evaluate
CO3426.6	Conduct Experimental or simulation studies and take observations, analyze and conclude the results.	Apply
CO3426.7	Develop a simulation model to apply a software tool to solve the problem	Create
CO3426.8	Fabricate a working model.	Create
CO3426.9	Prepare a thesis as per given university guidelines for the project taken up.	Apply
CO3426.10	Plan the tasks required the for the project and split among team for execution and complete the project within the stipulated time.	Apply
CO3426.11	Express the contribution towards the project as a team member while submitting the report.	Apply
CO3426.12	Participate in competitions or expos or technical publications to demonstrate the project outcomes.	Apply



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COURSE OUTCOMES (Cos):

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

Course code	CO Statement -Operations Research	TAXONOMY LEVEL
CO3321.1	Illustrate general Linear Programming problem.	Apply
CO3321.2	Find optimum solution for the Transportation problems.	Apply
CO3321.3	Determine the optimal solution for Assignment problems.	Apply
CO3321.4	Determine the best strategy and value of the given game model.	Apply
CO3321.5	Identify replacement policy and general cost function	Understand
CO3321.6	Understand the need of inventory management	Understand

Course code	CO Statement-Heat Transfer	TAXONOMY LEVEL
CO3322.1	Define and Explain modes of heat transfer and solve 1D heat conduction problems with and without heat generation	Understand
CO3322.2	Develop heat transfer relations for different fin configurations and solve 1D transient heat conduction problems	create
CO3322.3	Distinguish hydrodynamic and thermal boundary layers formed on a flat plate and to do the related problems	Apply
CO3322.4	Analyze different correlations developed for the estimation of natural convection heat transfer	Analyze
CO3322.5	Explain various regimes of pool boiling and condensation heat transfer, classify and analyze different heat exchangers	Analyze
CO3322.6	State and Discuss various laws of radiation heat transfer.	Understand

Course code	CO Statement-CAD/CAM	TAXONOMY LEVEL
CO3323.1	Express the concept of CAD/CAM/CIM and Other terminologies used in the development and manufacturing of a product.	Understand
CO3323.2	Describe the mathematical basis in the technique of representation of Understandgeometric entities including points, lines, and parametric curves, surfaces andsolid	Understand
CO3323.3	Describe the technique of transformation of geometric entities usingtransformation matrix.	Understand
CO3323.4	Express the concept of Group Technology, Flexible Manufacturing System.	Apply
CO3323.5	Describe the use of GT and CAPP for the product development	Understand
CO3323.6	Incorporate ergonomics, Identify the various elements and their activities in the Computer Integrated Manufacturing Systems.	Apply



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Course code	CO Statement-Unconventional Machining Processes	TAXONOMY LEVEL
CO332C.1	Identifying the classification of unconventional machining processes, and process of USM	Apply
CO332C.2	Evaluate the different processes parameters Abrasive jet Machining unconventional machining process	Evaluate
CO332C.3	Demonstrate the Electrochemical energy based unconventional machining process	Apply
CO332C.4	Demonstrate the Thermal energy (EDM) based unconventional machining processes	Apply
CO332C.5	Compare the concept of machining hard materials using chemical energy and electro-chemical energy	Analyze
CO332C.6	Select the suitable machining processes in Electron Beam, Laser, plasma and electrochemical energy based unconventional machining processes	Analyze

Course code	CO Statement –Automobile Engineering	TAXONOMY LEVEL
CO332H.1	Understand various components in four-wheel automobile.	Understand
CO332H.2	Differentiate between different types of transmission systems, suspension, and braking systems used in automobile.	Understand
CO332H.3	Examine steering geometry and steering systems used in automobile.	Apply
CO332H.4	Practice engine service for different components in automobile.	Apply
CO332H.5	Understand various safety and emission control processes systems used in automobile.	Understand
CO332H.6	Demonstrate the working of engine cooling, lubrication, ignition, fuels and fuel supply systems electrical and air conditioning systems.	Apply

Course code	CO Statement –Simulation of Mechanical Systems Lab	TAXONOMY LEVEL
CO3326.1	Understand the importance of the MATLAB /SCI LAB.	Understand
CO3326.2	Use MATLAB effectively to analyze and visualize data	Apply
CO3326.3	Apply numeric techniques and computer simulations to solve engineering-related problems.	Apply
CO3326.4	Write simple programs in MATLAB to solve scientific and mathematical problems	Apply
CO3326.5	Understand the main features and importance of the MATLAB/ SCI LAB mathematical programming environment.	Understand
CO3326.6	Apply working knowledge of MATLAB/ SCI LAB package to simulate and solve mechanical systems	Apply

Course code	CO Statement –Heat Transfer Lab	TAXONOMY LEVEL
CO3327.1	Estimate heat transfer coefficients in forced convection, free convection, condensation and Correlate with theoretical values.	Apply
CO3327.2	Determine surface emissivity of a test plate.	Apply
CO3327.3	Calculate temperature distribution of study and transient heat conduction through planewall, cylinder and fin using numerical approach.	Apply
CO3327.4	Conduct experiments to determine convective heat transfer coefficient for free and forced Convection and correlate with theoretical values.	Apply



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CO3327.5	Perform experiments to determine the thermal conductivity of a metal rod, Solar cell.	Apply
CO3327.6	Perform experiment to determine the overall heat transfer coefficient in heat Exchanger.	Apply

Course code	CO Statement –CAD /CAM Lab	TAXONOMY LEVEL
CO3328.1	Utilize standard software tools to create part, assemblies and check for clearances.	Apply
CO3328.2	Modify 2d drafting to 3d using modelling software.	Apply
CO3328.3	Summarize the modern control in manufacturing systems (Fanuc, siemens)	Understand
CO3328.4	Utilize the concepts of g and m codes and manual part programming for modern manufacturing technology.	Apply
CO3328.5	Utilize Capp in machining and turning center	Apply
CO3328.6	Apply modern tools in design, manufacture and planning	Apply

Course code	CO Statement –Summer Internship	TAXONOMY LEVEL
CO3329.1	Student is able to construct the company profile by compiling the brief history, management structure, products / services offered, key achievements and market performance for his / her organization of internship.	Apply
CO3329.2	For his / her organization of internship, the student is able to assess its Strengths, Weaknesses, Opportunities and Threats (SWOT).	Understand
CO3329.3	Student is able to determine the challenges and future potential for his / her internship organization in particular and the sector in general.	Apply
CO3329.4	Student is able to test the theoretical learning in practical situations by accomplishing the tasks assigned during the internship period.	Apply
CO3329.5	Student is able to apply various soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship organization.	Apply
CO3329.6	Student is able to analyze the functioning of internship organization and recommend changes for improvement in processes.	analyze



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DEPARTMENT OF MECHANICAL ENGINEERING

Program Name:	B.TECH-MECHANICAL ENGINEERING	Academic Year	2021-22
Regulation	R20	Class / Sem	II/II

COURSE OUTCOMES (Cos):

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

Course code	CO Statement -Material Science & Metallurgy	TAXONOMY LEVEL
CO3221.1	Describe the properties of metals with respect to crystal structure and grain size	Understand
CO3221.2	Determine the phase diagrams of different metals	Apply
CO3221.3	Classify and distinguish different types of cast irons	Analyze
CO3221.4	Classification of heat treatment of steels & strengthening mechanisms	Analyze
CO3221.5	Illustrate the powder metallurgy process	Illustrate
CO3221.6	Determine the use of ceramics and composites in engineering applications	Determine

Course code	CO Statement-Complex Variables and Statistical Methods	TAXONOMY LEVEL
CO3222.1	Apply the concept and consequences of analyticity and the Cauchy-Riemann equations	Apply
CO3222.2	Use Cauchy's integral theorem and formula to compute line integral	Apply
CO3222.3	Classify singularities, compute the residue of a function and able to apply the concepts of the calculus of residues in the evaluation of integrals	Analyze
CO3222.4	Understand the concept of discrete and continuous random variables	Understand
CO3222.5	Apply the necessary sampling techniques based on the objective	Apply
CO3222.6	Discuss the definitions and properties of chi-square, t and F-distributions	Understand

Course code	CO Statement-Dynamics of Machinery	TAXONOMY LEVEL
CO3223.1	Interpret frictional torque and power in bearings clutches, brakes, dynamometers and governors	Apply
CO3223.2	Analyze static and dynamic force in mechanisms and design of flywheel	Analyze
CO3223.3	Understand the gyroscopic effect	Understand
CO3223.4	Execute the turning moment diagram for IC Engines	Execute
CO3223.5	Apply the concept of balancing of rotating and reciprocating masses	Apply
CO3223.6	Demonstrate Free vibrations of single degree freedom systems	Apply



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Course code	CO Statement-Thermal Engineering-I	TAXONOMY LEVEL
CO3224.1	Learn and understand the reasons and effects of various losses that occurs in the actual engine operation.	Understand
CO3224.2	Know the working of I.C Engines and functions of engine systems	Apply
CO3224.3	Discuss the combustion stages and knocking phenomenon in I.C Engines	Understand
CO3224.4	Make the student learn to perform testing on S.I and C.I Engines to do calculations of performance parameters	Apply
CO3224.5	Explain the working and analyze the performance of Gas Turbines	Analyze
CO3224.6	Describe the working and analyze the performance of jets and Rockets	Analyze

analyze

Course code	CO Statement –Industrial Engineering and Management	TAXONOMY LEVEL
CO3225.1	To identify, formulate, and solve complex engineering problems by applying principles of industrial engineering and management.	Apply
CO3225.2	Apply the concepts & principles of management in real life industry.	Apply
CO3225.3	To understand the concepts of maintenance management	Understand
CO3225.4	To understand and examine the concepts of work study in industrial setting.	Apply
CO3225.5	To interpret the application of statistics in quality control using SQC techniques	Apply
CO3225.6	To understand the key concepts and practices within the field of HRM	Apply

Course code	CO Statement –Mechanics of Solids and Metallurgy Lab	TAXONOMY LEVEL
CO3226.1	Apply basic concepts of stress, strain and their relations based on linear elasticity. Material behaviors due to different types of loading will be discussed	Apply
CO3226.2	Calculate stresses and deformation of a bar due to an axial loading under uniform and non-uniform conditions.	Apply
CO3226.3	Analyze and interpret laboratory data relating to behaviour of structures and the materials they are made of, and undertake associated laboratory work individually and in teams.	Analyze
CO3226.4	Undertake problem identification, formulation and solution using a range of analytical methods. Calculate normal and shear stresses on any cross- section of a beam	Apply
CO3226.5	Characterize the microstructures of different ferrous and non-ferrous metals.	Analyze
CO3226.6	Apply the effect of heat treatment and cooling rates on the properties of steels	Apply



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Course code	CO Statement –Machine Drawing Practice	TAXONOMY LEVEL
CO3227.1	Draw different types of bearings and threads showing different components.	Apply
CO3227.2	Apply limits and tolerances to assemblies and choose appropriate fits.	Apply
CO3227.3	Recognize machining and surface finish symbols.	Apply
CO3227.4	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.	Apply
CO3227.5	Identify the national and international standards pertaining to machine drawing.	Understand
CO3227.6	Explain fastening arrangements such as welding, riveting the different styles of attachment for shaft.	Understand

Course code	CO Statement –Theory of Machines Lab	TAXONOMY LEVEL
CO3228.1	Relate to fundamental knowledge of dynamics of machines like dynamic balancing, flywheel analysis, gyroscopic forces and moments.	Apply
CO3228.2	Experiment with the velocity and acceleration concepts and the methodology using graphical methods and principles and application of four bar chain.	Apply
CO3228.3	Analyze the applications of cams and their working principles.	Analyze
CO3228.4	Test vibrations and its significance on engineering design.	Evaluate
CO3228.5	Understand the applications of screw Jack mechanism	Understand
CO3228.6	Illustrate gears, power transmission through different types of gears including gear profiles	Apply

Course code	CO Statement –Python Programming Lab	TAXONOMY LEVEL
CO3229.1	Demonstrate the basic concepts of python programming with the help of data types, operators and expressions, console input/output	Apply
CO3229.2	Make use of control statements for altering the sequential execution of programs in solving problems	Apply
CO3229.3	Demonstrate operations on built-in container data types (list, tuple, set, dictionary) and strings	Apply
CO3229.4	Make use of operations and applications on strings with the help of built in functions	Apply
CO3229.5	Solve the problems by using modular programming concepts through functions.	Apply
CO3229.6	Identify object-oriented programming constructs for developing large, modular and reusable real-time programs	Understand



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