



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

Program Name:	M.TECH-MACHINE DESIGN	Academic Year	2021-22
Regulation	R19	Class / Sem	I/I

COURSE OUTCOMES (Cos):

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

Course code	CO Statement - Advanced Mechanics of Solids	TAXONOMY LEVEL
CO15111.1	Analyze state of stresses and strains in a 3-D continuum	Analyze
CO15111.2	Apply failure criteria and analyze the various modes of failures	Apply
CO15111.3	analyze mechanical structures using energy methods.	analyze
CO15111.4	Evaluate stresses in symmetrical and asymmetrical beams	Evaluate
CO15111.5	Analyze the stresses induced in torsional bars of various cross sections	Analyze
CO15111.6	Apply the various methods of determining of contact stresses.	Apply

Course code	CO Statement-Mechanical vibrations and Acoustics	TAXONOMY LEVEL
CO15112.1	Analyze the causes and effects of vibrations in mechanical systems and identify discrete and continuous systems	Analyze
CO15112.2	Compute the forced vibration responses of multi degree of freedom systems through modal analysis and interpret the results.	Apply
CO15112.3	Compute the free vibration responses of multi degree of freedom systems through modal analysis and interpret the results.	Apply
CO15112.4	Apply energy methods to analyze the torsional and transverse vibrations	Apply
CO15112.5	Illustrate the basic principles of acoustics	Apply
CO15112.6	analyze and design to control and reduce vibration effects in machinery	Analyze

Course code	CO Statement-Geometric modelling	TAXONOMY LEVEL
CO151133.1	Apply explicit and implicit equations and parametric equations	Apply
CO151133.2	Analyze the curves using different forms of cubic spline	Analyze
CO151133.3	Derive equations of bezier curve on the basis of bezier	Apply
CO151133.4	Derive equations of B-spline curve on the basis of b-spline basis	Apply
CO151133.5	Illustrate the various typed of surfaces in Geometric modelling	Apply
CO151133.6	Apply solid modelling concepts for classification of problem	Apply

Course code	CO Statement-Non Destructive Evaluation	TAXONOMY LEVEL
CO151141.1	Apply importance of different non-destructive techniques and underlying principles	Apply
CO151141.2	ultrasonic Understand testing and apply its principles to find defects	Understand
CO151141.3	Use the principles of Magnetic particle testing on different work pieces	Apply
CO151141.4	Explain the process of Dye penetration tests	Understand
CO151141.5	Apply the principles of Eddy Current testing to find defects	Apply
CO151141.6	List the applications of Non-destructive testing in different industries.	Understand



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Course code	CO Statement-Machine Dynamics lab	TAXONOMY LEVEL
CO15115.1	Evaluate the vibration parameters using undamped and damped free and forced vibrations	Evaluate
CO15115.2	Determination of the magnitude of gyroscopic couple, angular velocity of precession, and representation of vectors.	Apply
CO15115.3	Estimate the unbalance and balance the rotors.	Apply
CO15115.4	Analyze the kinematics of robots	Analyze
CO15115.5	analyze determination of friction, wear using pin-on-disc.	Analyze
CO15115.6	Identify the natural modes and study the influence of initial conditions on the response of a two degree of freedom systems	Understand

Course code	CO Statement –Design practice lab-I	TAXONOMY LEVEL
CO15116.1	Apply geometric transformations and projection methods in CAD	Apply
CO15116.2	Design surface models for engineering design	Create
CO15116.3	Apply Model engineering components using solid modelling techniques for design	Apply
CO15116.4	analyze the 3-D structures of structural analysis using FEA Package	Analyze
CO15116.5	Analyze the 3-D structures elements of thermal analysis using FEA packages	Analyze
CO15116.6	Analyze the 3-D structures elements of tranient analysis using FEA packages	Analyze

Course code	CO Statement –Research methodology and IPR	TAXONOMY LEVEL
CO15117.1	Understand objectives and characteristics of a research problem	Understand
CO15117.2	Analyze research related information and to follow research ethics	Analyze
CO15117.3	Understand the types of intellectual property rights	Understand
CO15117.4	Explain the procedure for grants of patents, patenting under PCT.	Understand
CO15117.5	Learn about the scope of IPR	Understand
CO15117.6	Understand the new developments in IPR	Understand



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

Course code	CO Statement – Additive Manufacturing	TAXONOMY LEVEL
CO15211.1	Illustrate the principles and classification of additive manufacturing processes	Apply
CO15211.2	Demonstrate the various machines for rapid prototyping	Apply
CO15211.3	Explain the strategies and applications of rapid prototyping in industrial product development	Understand
CO15211.4	Analyze the tooling processes in methods for manufacture of tools for plastic components	Analyze
CO15211.5	Analyze the tooling processes in methods for manufacture of tools for metal components	Analyze
CO15211.6	Apply direct rapid tooling processes in rapid prototyping methods	Apply

Course code	CO Statement-Mechanical vibrations and Acoustics	TAXONOMY LEVEL
CO15212.1	Analyze the effects of nano scale elements properties and their applications	Analyze
CO15212.2	Apply various approaches to synthesis of nano materials	Apply
CO15212.3	Analyze the various techniques to characterize the nano structured materials	Analyze
CO15212.4	Explain Metal and semiconductor nanoparticles Synthesis	Understand
CO15212.5	Apply various synthesis techniques for nano wires and sensors	Apply
CO15212.6	Analyze the structure and properties of carbon nano tubes in electronic devices	Analyze



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Course code	CO Statement –Dissertation phase- I	TAXONOMY LEVEL
CO15213.1	Identify right problem and come with abstract for the proposed problem.	Remember
CO15213.2	Build a prospective solution based on recent literature survey and data gathering.	Create
CO15213.3	Identify the various resources and components required to complete project.	Remember
CO15213.4	Solve the problem by creating a working model implementation or simulation study using a tool.	Apply
CO15213.5	Justify the project work progress to a panel of experts in the form of written report and presentation.	Evaluate
CO15213.6	Conduct Experimental or simulation studies and take observations, analyze and conclude the results.	Evaluate
CO15213.7	Develop a simulation model to apply a software tool to solve the problem	Create
CO15213.8	Fabricate a working model.	Analyze
CO15213.9	Prepare a thesis as per given university guidelines for the project taken up.	Create
CO15213.10	Plan the tasks required the for the project and split among team for execution and complete the project within the stipulated time.	Remember
CO15213.11	Express the contribution towards the project as a team member while submitting the report.	Understand
CO15213.12	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 - Advanced finite element methods	TAXONOMY LEVEL
CO15121.1	Make use of the concept of finite element method for solving machine design problems	Apply
CO15121.2	Solve problems in 1-D structural systems involving bars, trusses, beams and frames	Apply
CO15121.3	Develop 2-D and 3-D FE formulations involving triangular, quadrilateral elements and higher order elements	Create
CO15121.4	analyze the problems of heat transfer modes in fem	analyze
CO15121.5	Apply the knowledge of FEM for stress analysis, model analysis, heat transfer analysis and flow analysis.	Apply
CO15121.6	Develop algorithms and FE code for solving design problems and adapt commercial packages for complex problems.	Create

Course code	CO Statement-Advanced machine design	TAXONOMY LEVEL
CO15122.1	Design mechanical components by selecting a suitable material and failure criteria.	Create
CO15122.1	Evaluate fatigue life of mechanical components for ductile and brittle materials	Evaluate
CO15122.1	Apply fatigue failure theories of mechanical elements	Apply
CO15122.3	Analyze and predict the fracture strength of mechanical components under different fracture modes	Analyze
CO15122.4	Design mechanical components involving contacts avoiding the surface failures.	Create
CO15122.5	Illustrate the economic factors which are influence on design	Apply

Course code	CO Statement-theory of plasticity	TAXONOMY LEVEL
CO151233.1	Analyze the uniaxial behavior in plasticity using various representations	Analyze
CO151233.2	Analyze the various stress strain relations using principle of virtual work and rate of forms	Analyze
CO151233.3	Apply the concept of effective stress and strain mixed problems	Apply
CO151233.4	Apply Finite element formulation for an elastic plastic matrix	Apply
CO151233.5	Apply various criteria's for loading and unloading elements	Apply
CO151233.6	Analyze boundary surface theory for an uniaxial and biaxial loading for analysis	Analyze



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Course code	CO Statement-design with advanced materials	TAXONOMY LEVEL
CO151241.1	Apply fundamentals of materials science on various conventional materials in advancement	Apply
CO151241.2	Illustrate the various selection parameters for use of materials in usage	Apply
CO151241.3	Illustrate the modern metallics materials and analyze	Apply
CO151241.4	Analyze the composite materials	Analyze
CO151241.5	Analyze the various techniques for production on non metallic materials	Analyze
CO151241.6	Explain the various advance materials on of smart materials	Understand

Course code	CO Statement – Computational Mathematics Lab	TAXONOMY LEVEL
CO15121.1	Generate a MATLAB an python code for solving a system of linear equation, LU decomposition and jocobi methods	Create
CO15121.2	Generate a mat lab and python code straight line fit, polynomial curve fit	Create
CO15121.3	Apply mt lab applications o Fourier transformations	Apply
CO15121.4	Use MAT LAB and python code for solving various numerical methods equations	Apply
CO15121.5	Use MATLAB and python code for matrices and eigen values	Apply
CO15121.6	Apply MAT lab anf python codes on partial differential equations	Apply

Course code	CO Statement – Design practice lab -II	TAXONOMY LEVEL
CO15121.1	Analyze the simulation of basic hydraulic, Pneumatic and electric circuits using software	Analyze
CO15121.2	Experiment the testing on fluid power control	Apply
CO15121.3	Analyze the sequential and hydraulic motor circuit using hydraulic systems	Analyze
CO15121.4	Demonstrate the controller interfacing for different control systems	Apply
CO15121.5	Apply the concepts of microscopy techniques to analyze the various parameters	Apply
CO15121.6	Experiment on materials for analyzing the characteristics of materials	Apply



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

Course code	CO Statement –Dissertation phase- II	TAXONOMY LEVEL
CO15213.1	Identify right problem and come with abstract for the proposed problem.	Remember
CO15213.2	Build a prospective solution based on recent literature survey and data gathering.	Create
CO15213.3	Identify the various resources and components required to complete project.	Remember
CO15213.4	Solve the problem by creating a working model implementation or simulation study using a tool.	Apply
CO15213.5	Justify the project work progress to a panel of experts in the form of written report and presentation.	Evaluate
CO15213.6	Conduct Experimental or simulation studies and take observations, analyze and conclude the results.	Evaluate
CO15213.7	Develop a simulation model to apply a software tool to solve the problem	Create
CO15213.8	Fabricate a working model.	Analyze
CO15213.9	Prepare a thesis as per given university guidelines for the project taken up.	Create
CO15213.10	Plan the tasks required the for the project and split among team for execution and complete the project within the stipulated time.	Remember
CO15213.11	Express the contribution towards the project as a team member while submitting the report.	Understand
CO15213.12	Participate in competitions or expos or technical publications to demonstrate the project outcomes.	Apply