



AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Approved by A.I.C.T.E., New Delhi, & Permanently Affiliated to J.N.T.U-GV, Vizianagaram)

NAAC "B++" Accredited Institute

Cherukupally (Village), Near Tagarapuvalasa Bridge, Vizianagaram (Dist) -531162.

www.aietta.ac.in, principal@aietta.ac.in

Department of Mechanical Engineering

Program: M.Tech -CAD/CAM

Regulation: R16

Course Outcomes

No. of Courses: 21

I Sem	Course: Industrial Robotics
CO-1	Demonstrate knowledge of industrial robots, characteristics, end effectors and actuators.
CO-2	Apply spatial transformation to obtain forward and inverse kinematics.
CO-3	Solve robot dynamics problems, generate joint trajectory for path planning.
CO-4	Describe working principle of various sensors and program different operations.
CO-5	Appreciate applications of robots in industry.
I-I Sem	Course: Computer Aided manufacturing
CO-1	Understand the features and specifications of CNC machines.
CO-2	Develop the process planning sheets and tool layouts.
CO-3	Understand the CAM software and its programming
CO-4	Use the CAM software and prepare CNC part programs.
CO-5	Execute the part program and machine the component as per the production drawing.
I-I Sem	Course: Special manufacturing Process
CO-1	Analyze and access the use of casting processes in manufacturing and understand the working of various casting processes.
CO-2	Understand the basics of metal cutting and working of different types of machine tools.
CO-3	Explain the conventional and advanced metal forming processes and composite fabrication.
CO-4	Analyze and access the importance of welding processes in manufacturing.
CO-5	Apply knowledge to select appropriate welding process based on the type of industrial application
I-I Sem	Course: Geometric Modeling
CO-1	To produce engineering drawings.
CO-2	Applications of geometric modeling techniques.
CO-3	Modelling complex curves and surfaces.



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CO-4	Basics of geometrical modeling and computer graphics.
CO-5	Visualize the machine components and assemblies before their actual fabrication through modeling, animation, shading, rendering, lighting and coloring.
I-I Sem	Course: Computational Methods in Engineering (Elective –I)
CO-1	Solve linear and nonlinear algebraic equations and systems of nonlinear equations using numerical techniques
CO-2	Use regression and interpolation methods for curve fitting.
CO-3	Select and apply numerical schemes for differentiating and integrating complicated functions.
CO-4	Apply computational schemes for solving systems of ordinary differential equations.
CO-5	Solve PDEs by numerical methods
I-I Sem	Course: Mechanical Vibrations(Elective – I)
CO-1	Explain basics of sound, noise and vibration; as well as their control strategies.
CO-2	Derive equations of motion for undamped one-dimensional vibrations, and solve problems of damped free vibrations.
CO-3	Analyse and solve problems of forced vibrations involving frequency response curves, phase angle plots, vibration isolation and transmissibility.
CO-4	Analyse and solve problems involving vibrations of systems having more than one degree of freedom.
CO-5	Recall and explain concepts involving vibrations of continuous systems.
I-I Sem	Course: Design for Manufacturing & Assembly(Elective-II)
CO-1	Outline the appropriate design for economical production and select the materials
CO-2	Select between various machining and metal joining processes
CO-3	Apply a systematic understanding of knowledge in the field of metal casting and forging
CO-4	Fabricate basic parts and assemblies using powered and non – powered machine shop equipment in conjunction with mechanical documentation.
CO-5	Integrate the knowledge of compliance analysis and interference analysis for assembly and also use visco-elastic and creep in plastics.
I-I Sem	Course: Mechatronics(Elective-II)
CO-1	Identify key elements of mechatronics system and its representation in terms of block diagram.
CO-2	Understand the concept of signal processing and use of interfacing systems such as ADC, DAC, digital I/O.



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CO-3	Understand Interfacing of Sensors, Actuators using appropriate DAQ micro-controller.
CO-4	Apply Time and Frequency domain analysis of system model (for control application).
CO-5	Develope PLC ladder programming and implementation of real life system.
I-I Sem	Course: Computer Aided Process Planning(Elective-II)
CO-1	Generate the structure of automated process planning system and uses the principle of generative and retrieval CAPP systems for automation
CO-2	Select the manufacturing sequence and explains the reduction of total set up cost for a particular sequence
CO-3	Predict the effect of machining parameters on production rate, cost and surface quality and determines the manufacturing tolerances
CO-4	Know the generation of tool path and solve optimization models of machining processes
CO-5	Create awareness about the implementation techniques for CAPP
I-I Sem	Course: Advanced CAD Lab
CO-1	Use software like AutoCAD, Inventor/ Pro E/ Unigraphics
CO-2	Make 3D modelling, Assembling, modification & manipulation along with detailing.
CO-3	Prepare surface modelling and sheet metal operations through various exercises
I-II Sem	Course: Modeling & Simulation of Manufacturing Systems
CO-1	Understand the principles of management theory & Recognize the characteristics of an organization.
CO-2	Demonstrate the importance of key performance areas in strategic management & decision-making process.
CO-3	Design appropriate organizational structures and possess an ability to conceive organizational dynamics.
CO-4	Evaluate attitudes and personality traits for inter personal effectiveness and development within organizations.
CO-5	Implement the right leadership practices in organizations that would enable systems orientation.
I-II Sem	Course: Optimization and Reliability
CO-1	Learn the principles, techniques and tools for modeling and solving decision making problems.
CO-2	Discuss quadratic programming problems, separable programming problems and their applications.



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CO-3	Acquire knowledge on the concept of dynamic programming.
CO-4	Gain knowledge on multi-objective optimization and goal programming.
CO-5	Acquire basic knowledge of total quality management.
CO-6	Understand the concepts of reliability and maintainability.
I-II Sem	Course: Computer Graphics
CO-1	Understand the basics of computer graphics, different graphics systems and applications of computer graphics. ..
CO-2	Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
CO-3	Use the geometric transformations on graphics objects and their application in composite form.
CO-4	Extract scene with different clipping methods and its transformation to graphics display device.
CO-5	Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.
I-II Sem	Course: Finite Element Methods
CO-1	Recall potential energy concepts or vibrational methods for solving complex structural geometries of aeronautical, mechanical and civil applications.
CO-2	Explain the shape function concepts of one and two dimensional elements for enriching knowledge on stiffness matrix and load vector.
CO-3	Apply numerical methods on one dimensional bar elements for obtaining displacements, stresses, strains and reaction forces.
CO-4	Make use of shape functions of two degree of freedom two noded truss and beam elements for obtaining stiffness matrix and load vector.
CO-5	Demonstrate the physical models of truss and beam elements by applying finite element method for displacements, stresses and strains.
I-II Sem	Course: Quality Engineering in Manufacturing (Elective – III)
CO-1	Attain the basic techniques of quality improvement, fundamental knowledge of statistics and probability
CO-2	Use control charts to analyze for improving the process quality.
CO-3	Describe different sampling plans
CO-4	Acquire basic knowledge of total quality management
CO-5	Understand the concepts of reliability and maintainability
I-II Sem	Course: Fracture Mechanics (Elective – III)



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CO-1	Have a solid foundation in the theory, concepts and principles of fracture mechanics.
CO-2	Gain the physical intuition necessary to idealise a complicated practical problem.
CO-3	Possess the analytical and computational tools needed to solve the idealised problem.
CO-4	Have acquired the judgment required to interpret the results of these solutions.
CO-5	Use these solutions to guide a corresponding design, manufacture, or failure analysis.
I-II Sem Course: Concurrent Engineering (Elective -III)	
CO-1	Understand the need for adopting CE methodology to organizations.
CO-2	Understand the importance of such factors as the right corporate culture, multidisciplinary teams and their empowerment for successful implementation of CE.
CO-3	Undertake an evaluation of the company's present communication infrastructure and recommend suitable changes to support the CE environment.
CO-4	Become familiar with a range of computer based tools for modeling engineering processes and information.
CO-5	Understand various factors and techniques required to optimize the product development process.
I-II Sem Course: Mechanics and Manufacturing Methods of Composites (Elective -IV)	
CO-1	Explain the mechanical behavior of layered composites compared to isotropic materials.
CO-2	Apply constitutive equations of composite materials and understand mechanical behavior at micro and macro levels.
CO-3	Determine stresses and strains relation in composites materials.
CO-4	Illuminate the knowledge and analysis skills in applying basic laws in mechanics to the composite materials.
CO-5	Explain the behavior of constituents in the composite materials
I-II Sem Course: Materials Technology (Elective -IV)	
CO-1	Describe molecular structure, microstructures and corresponding properties for common materials.
CO-2	Use fundamental framework and relations to quantify features of material structures, the effect of important mechanisms and the properties of materials
CO-3	Solve basic engineering problems related to materials selection for components and structures.
CO-4	Recognize the needs for specific material competence in different engineering projects.



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CO-5	Make sound estimates and judgments about the feasibility of engineering solutions involving materials and material selection.
I-II Sem	Course: Intelligent Manufacturing Systems (Elective -IV)
CO-1	Assess the performance of manufacturing systems.
CO-2	Develop a systematic approach for design and implementation of manufacturing systems.
CO-3	suggest new procedures to improve the productivity of existing manufacturing systems.
CO-4	Utilise online collaboration tools to work in complex teams.
CO-5	Learn computer integrated manufacturing and enterprise integration.
I-II Sem	Course: vModeling and Analysis of Manufacturing Processes Lab
CO-1	Understand the Pattern design and making, casting drawing .
CO-2	Utilize and determination of Sand properties testing for strengths and permeability.
CO-3	Demonstrate practical understanding molding and melting and casting.




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Bhogapuram (M), Vizianagaram (D)-531162