



## Department of Mechanical Engineering

Program: B. Tech – Mechanical Engineering

Regulation: R19

Course Outcomes

No. of Courses: 90

|                |  |
|----------------|--|
| <b>I-I Sem</b> | <b>Course : Mathematics-I</b>  |
| CO-1           | utilize mean value theorems to real life problems  |
| CO-2           | solve the differential equations related to various engineering fields   |
| CO-3           | familiarize with functions of several variables which is useful in optimization  |
| CO-4           | Apply double integration techniques in evaluating areas bounded by region  |
| CO-5           | learn important tools of calculus in higher dimensions   |
| <b>I-I Sem</b> | <b>Course : Mathematics - II</b>   |
| CO-1           | develop the use of matrix algebra techniques that is needed by engineers for practical applications                          |
| CO-2           | solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel                               |
| CO-3           | evaluate approximating the roots of polynomial and transcendental equations by different algorithms                          |
| CO-4           | apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals                      |
| CO-5           | apply different algorithms for approximating the solutions of ordinary differential equations to its analytical computations |
| <b>I-I Sem</b> | <b>Course : Engineering Physics</b>  |
| CO-1           | able to Construction and working details of instruments, ie., Interferometer, Diffractometer and Polarimeter are learnt.     |
| CO-2           | able to Study EM-fields and semiconductors under th concepts of Quantum mechanics paves way for their optimal utility        |
| CO-3           | Able to the fundamental concepts of quantum mechanics.   |
| CO-4           | Able to the various electron theories.   |
| CO-5           | Able to the energy bands of semiconductors.  |
| <b>I-I Sem</b> | <b>Course : Programming For Problem Solving Using C</b>  |
| CO-1           | To write algorithms and to draw flowcharts for solving problems  |
| CO-2           | To convert flowcharts/algorithms to C Programs, compile and debug programs   |
| CO-3           | To use different operators, data types and write programs that use two-way/ multi-way selection                              |





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|                |   |
|----------------|---|
| CO-4           | To select the best loop construct for a given problem   |
| CO-5           | To design and implement programs to analyze the different pointer applications  |
|                |   |
| <b>I-I SEM</b> | <b>Course : Engineering Drawing</b>   |
| CO1            | Use drawing instruments to draw polygons and Engineering Curves.  |
| CO2            | Construct scales and draw Orthographic projections  |
| CO3            | draw projections of points  |
| CO4            | draw projections of planes  |
| CO5            | Describe and draw projections of solids   |
|                |   |
| <b>I-I Sem</b> | <b>Course : English Lab</b>   |
| CO-1           | Better pronunciation and accent   |
| CO-2           | Ability to use functional English   |
| CO-3           | Competency in analytical skills and problem solving skills  |
|                |   |
| <b>I-I Sem</b> | <b>Course : Engineering Physics Lab</b>   |
| CO-1           | Develop skills to impart practical knowledge in real time solution.   |
| CO-2           | Understand principle, concept, working and application of new technology and comparison of results with theoretical calculations.             |
| CO-3           | Understand measurement technology, usage of new instruments and real time applications in engineering studies                                 |
|                |   |
| <b>I-I Sem</b> | <b>Course : Programming For Problem Solving Using C Lab</b>   |
| CO-1           | Apply and practice logical ability to solve the problems.   |
| CO-2           | Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment |
| CO-3           | Analyze the complexity of problems, Modularize the problems into small modules and then convert them into programs                            |
|                |   |
| <b>I-I SEM</b> | <b>Course : Constitution of India</b>   |
| CO-1           | Understand the structure of Indian government   |
| CO-2           | Differentiate between the state and central government  |
| CO-3           | Explain the role of President and Prime Minister  |





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|-----------------|---|
| CO-4            | Know the Structure of supreme court and High court  |
| CO-5            | Analyze the History, features of Indian constitution  |
|                 |   |
| <b>I-II Sem</b> | <b>Course : English</b>   |
| CO-1            | understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information |
| CO-2            | ask and answer general questions on familiar topics and introduce oneself/others  |
| CO-3            | employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information                                |
| CO-4            | recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs  |
| CO-5            | form sentences using proper grammatical structures and correct word forms   |
|                 |   |
| <b>I-II Sem</b> | <b>Course : Engineering Chemistry</b>   |
| CO-1            | <i>Explain</i> the theory of construction of battery and fuel cells.  |
| CO-2            | <i>Understand</i> the importance of materials like nano materials and fullerenes and their uses.  |
| CO-3            | <i>Understand</i> importance molecular machines   |
| CO-4            | Understand the principles of different analytical instruments.  |
| CO-5            | Explain the different applications of analytical instruments.   |
|                 |   |
| <b>I-II SEM</b> | <b>Course : Engineering mechanics</b>   |
| CO1             | Identify the significance of centroid/ center of gravity and find centroids of composite figures and bodies.  |
| CO2             | Understand the moment of inertia and method of finding moment of inertia of areas and bodies  |
| CO3             | Identify the type of frame and analyze for the forces in the members of the truss (frame) by method of joints and method of sections.                 |
| CO4             | •Interpret the simple given dynamic problems and solve them for positions, velocities and accelerations, etc.,  |
| CO5             | Understand the kinetics of the rigid bodies and solve simple problems using work-energy method.   |
|                 |   |
| <b>I-II SEM</b> | <b>Course : Basic Electrical &amp; Electronics Engineering</b>  |
| CO-I            | Able to analyse the various electrical networks   |
| CO-2            | Able to understand the operation of DC generators,3-point starter and conduct the Swinburne's Test.   |
| CO-3            | Able to analyse the performance of transformer.   |





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|-----------------|---|
| CO-4            | Able to explain the operation of 3-phase alternator and 3-phase induction motors.                           |
| CO-5            | Able to analyse the operation of half wave, full wave rectifiers and OP-AMPs.                               |
|                 |   |
| <b>I-II SEM</b> | <b>Course : Engineering Drawing</b>   |
| CO1             | Use drawing instruments to draw polygons and Engineering Curves.  |
| CO2             | Construct scales and draw Orthographic projections  |
| CO3             | draw projections of points  |
| CO4             | draw projections of planes  |
| CO5             | Describe and draw projections of solids   |
|                 |   |
| <b>I-II Sem</b> | <b>Course : Communication Skills Lab</b>  |
| CO-1            | Better pronunciation and accent   |
| CO-2            | Ability to use functional English   |
| CO-3            | Competency in analytical skills and problem solving skills  |
|                 |   |
| <b>I-I Sem</b>  | <b>Course : Engineering Chemistry Lab</b>   |
| CO-1            | The students entering into the professional course have practically very little exposure to lab classes.    |
| CO-2            | The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; |
| CO-3            | Exposed to a few instrumental methods of chemical analysis.   |
|                 |   |
| <b>I-II Sem</b> | <b>Course : Basic Electrical Engineering Lab</b>  |
| CO-1            | Determine and predetermine the performance of DC machines and transformers.                                 |
| CO-2            | Control the DC shunt machines.  |
| CO-3            | Compute the performance of 1-phasetransformer.  |
|                 |   |
| <b>I-II SEM</b> | <b>Course : Engineering Workshop lab</b>  |
| CO1             | Design and model different prototypes in the carpentry trade such as Cross lap joint, Dove tail joint.      |
| CO2             | Design and model various basic prototypes in the trade of fitting such as Straight fit, V- fit.             |
| CO3             | Design various basic prototypes in the trade of Tin smithy such as rectangular tray, and open Cylinder.     |



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|                 |  |
| <b>II-I SEM</b> | <b>Course : Vector Calculus &amp; Fourier Transforms</b>   |
| C01             | Explain techniques in Vector calculus  |
| C02             | Define techniques of Laplace Transforms  |
| C03             | Derive techniques of Fourier series and Fourier Transforms   |
| C04             | Identify techniques in PDE of first order  |
| C05             | Investigate Second order PDE and Applications  |
|                 |  |
| <b>II-I SEM</b> | <b>Course : Mechanics Of Solids</b>  |
| C01             | Illustrate simple stresses & strains   |
| C02             | Draw shear force and bending moment  |
| C03             | Find flexural stresses   |
| C04             | Draw deflection of beams   |
| C05             | Solve thin and thick cylinders   |
|                 |  |
| <b>II-I SEM</b> | <b>Course : Materials Science &amp; Metallurgy</b>   |
| C01             | Explain crystalline structure of different metals and study the stability of phases in different alloy systems |
| C02             | Outline behaviour of ferrous and non-ferrous metals and alloys and their application in different domains      |
| C03             | Derive the effect of heat treatment, addition of alloying elements on properties of ferrous metals             |
| C04             | Illustrate methods of making of metal powders and applications of powder metallurgy                            |
| C05             | Discuss the properties and applications of ceramic, composites and other advanced methods                      |
|                 |  |
| <b>II-I SEM</b> | <b>Course : Production Technology</b>  |
| C01             | design the patterns and core boxes for metal casting processes   |
| C02             | design the gating system for different metallic components   |
| C03             | Teach the different types of manufacturing processes   |
| C04             | use forging, extrusion processes   |
| C05             | Teach the different types of welding processes used for special fabrication                                    |
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|-----------------|---|
| <b>II-I SEM</b> | <b>Course : Thermodynamics</b>  |
| C01             | Explain basic concepts of thermodynamics  |
| C02             | discuss Laws of thermodynamics  |
| C03             | Restate Concept of entropy  |
| C04             | explain Property evaluation of vapors and their depiction in tables and charts  |
| C05             | evaluate properties of perfect gas mixtures   |
| <b>II-I SEM</b> | <b>Course : Machine Drawing</b>   |
| C01             | Draw and represent standard dimensions of different mechanical fasteners and joints and Couplings   |
| C02             | Draw different types of bearings showing different components   |
| C03             | 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 |
| C04             | Select and represent fits and geometrical form of different mating parts in assembly drawings   |
| C05             | prepare manufacturing drawings indicating fits, tolerances, surface finish and surface treatment requirements   |
| <b>II-I SEM</b> | <b>Course : Metallurgy &amp; Mechanics Of Solids Lab</b>  |
| C01             | impart practical exposure on mechanics of solids lab  |
| C02             | impart practical exposure on metallurgy lab   |
| <b>II-I SEM</b> | <b>Course : Production Technology Lab</b>   |
| C01             | impart hands-on practical exposure on design and making of pattern  |
| C02             | impart hands-on practical exposure on sand properties testing   |
| C03             | impart hands-on practical exposure on mould preparation   |
| <b>II-I SEM</b> | <b>Course : Environmental Science</b>   |
| C01             | impart Multidisciplinary nature of Environmental Studies  |
| C02             | impart Natural Resources  |
| C03             | impart Biodiversity and its conservation  |
| C04             | impart Environmental Pollution  |
| C05             | impart Social Issues and the Environment  |





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| <b>II-I SEM</b>  | <b>Course : Socially Relevant Project</b>   |
| C01              | produce a project document on Water Conservation Related Works  |
| C02              | produce a project document on Street light monitoring   |
| C03              | produce a project document on E- policing & cyber solution  |
| C04              | produce a project document on Any social related  |
|                  |   |
| <b>II-II SEM</b> | <b>Course : Complex Variables &amp; Statistical Methods</b>   |
| C01              | apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic (L3)    |
| C02              | find the differentiation and integration of complex functions used in engineering problems (L5)                                   |
| C03              | make use of the Cauchy residue theorem to evaluate certain integrals (L3)   |
| C04              | apply discrete and continuous probability distributions (L3)  |
| C05              | design the components of a classical hypothesis test (L6)   |
|                  |   |
| <b>II-II SEM</b> | <b>Course : Kinematics Of Machinery</b>   |
| C01              | Contrive a mechanism for a given plane motion with single degree of freedom   |
| C02              | Suggest and analyse a mechanism for a given straight line motion and automobile steering motion                                   |
| C03              | Analyse the motion (velocity and acceleration) of a plane mechanism   |
| C04              | Suggest and analyse mechanisms for a prescribed intermittent motion like opening and closing of IC engine valves etc              |
| C05              | Select a power transmission system for a given application and analyze motion of different transmission systems                   |
|                  |   |
| <b>II-II SEM</b> | <b>Course : Applied Thermodynamics</b>  |
| C01              | Assess the working of steam power cycles and also should be able to analyse and evaluate the performance of individual components |
| C02              | Justify the principles of combustion , stoichiometry and flue gas analysis  |
| C03              | design the components and calculate the losses and efficiency of the boilers, nozzles and impulse turbines                        |
| C04              | design the components and calculate the losses and efficiency of reactions turbines and condensers                                |
| C05              | Compare various types of compressors, principles of working and their performance evaluation                                      |
|                  |   |





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| <b>II-II SEM</b> | <b>Course : Fluid Mechanics &amp; Hydraulic Machines</b>   |
| CO1              | Explain the basic concepts of fluid properties   |
| C02              | Discuss the mechanics of fluids in static and dynamic conditions   |
| C03              | Use boundary layer theory, flow separation and dimensional analysis  |
| C04              | Restate hydrodynamic forces of jet on vanes in different positions   |
| C05              | List hydrodynamic forces of jet on vanes in different positions  |
| <b>II-II SEM</b> | <b>Course : Metal Cutting &amp; Machine Tools</b>  |
| C01              | Explain the fundamental knowledge and principals in material removal process   |
| C02              | Acquire the knowledge on operations in conventional, automatic, Capstan and turret lathes  |
| C03              | Capable of understanding the working principles and operations of shaping, slotting, planning, drilling and boring machines  |
| C04              | make gear and keyway in milling machines and understand the indexing mechanisms  |
| C05              | Compare the different types of unconventional machining methods and principles of finishing processes  |
| <b>II-II SEM</b> | <b>Course : Design Of Machine Members – I</b>  |
| C01              | Calculate different stresses in the machine components subjected to various static loads, failures and suitability of a material for an engineering application  |
| C02              | Calculate dynamic stresses in the machine components subjected to variable loads   |
| C03              | Design riveted, welded, bolted joints, keys, cotters and knuckle joints subjected to static loads and their failure modes  |
| C04              | Design the machine shafts and suggest suitable coupling for a given application  |
| C05              | Calculate stresses in different types of springs subjected to static loads and dynamic loads   |
| <b>II-II SEM</b> | <b>Course : Fluid Mechanics &amp; Hydraulic Machinery Lab</b>  |
| C01              | impart practical exposure on Impact of jets on Vanes   |
| C02              | impart practical exposure on Performance Test on Pelton Wheel, Performance Test on Francis Turbine, Performance Test on Kaplan Turbine, Performance Test on Single Stage Centrifugal Pump, Performance Test on Multi Stage Centrifugal Pump and Performance Test on Reciprocating Pump |
| C03              | impart practical exposure on Calibration of Venturi meter, Calibration of Orifice meter, Determination of friction factor for a given pipe line, Determination of loss of head due to sudden contraction in a pipeline and Turbine flow meter  |





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| <b>II-II SEM</b> | <b>Course : Machine Tools Lab</b>  |
| C01              | Explain the parts of Lathe, drilling machine, Milling machine, Shaper, Planning machine, Slotting machine, cylindrical grinder, Surface grinder and Tool and cutter grinder  |
| C02              | Describe Operations on Lathe machines  |
| C03              | Discuss Operations on Drilling machine   |
|                  |  |
| <b>III-I SEM</b> | <b>Course : Dynamics Of Machinery</b>  |
| C01              | compute the frictional losses and transmission in clutches, brakes and dynamometers  |
| C02              | determine the effect of gyroscopic couple in motor vehicles, ships and aeroplanes  |
| C03              | analyse the forces in four bar and slider crank mechanisms and design a flywheel   |
| C04              | determine the rotary unbalanced mass in reciprocating equipment  |
| C05              | determine the unbalanced forces and couples in reciprocating and radial engines  |
|                  |  |
| <b>III-I SEM</b> | <b>Course : Design Of Machine Members-II</b>   |
| C01              | Select the suitable bearing based on the application of the loads and predict the life of the bearing  |
| C02              | Design of IC Engines parts   |
| C03              | Design of power transmission elements such as gears, belts, chains, pulleys, ropes, levers and power screws  |
| C04              | Design spur & helical gear for different engineering applications  |
|                  |  |
| <b>III-I SEM</b> | <b>Course : Mechanical Measurements &amp; Metrology</b>  |
| C01              | Describe the construction and working principles of measuring instruments for measurement of displacement and speed and select appropriate instrument for a given application  |
| C02              | Describe the construction and working principles of measuring instruments for strain, force, Torque, power, acceleration and Vibration and select appropriate instrument for a given application   |
| C03              | 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 |
| C04              | Explain methods for linear, angle and flatness measurements and select a suitable method and its relevant instrument for a given application   |
| C05              | measure the threads, gear tooth profiles, surface roughness and flatness using appropriate instruments and analyze the data  |
|                  |  |





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|------------------|---|
| <b>III-I SEM</b> | <b>Course : Managerial Economics And Financial Accountancy</b>  |
| C01              | estimate the Demand and demand elasticities for a product   |
| C02              | Differentiate the Input-Output-Cost relationships and estimation of the least cost combination of inputs  |
| C03              | Discuss the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units |
| C04              | prepare Financial Statements and the usage of various accounting tools for Analysis   |
| C05              | evaluate various investment project proposals with the help of capital budgeting techniques for decision making   |
| <b>III-I SEM</b> | <b>Course : IC Engines &amp; Gas Turbines</b>   |
| C01              | Derive the actual cycle from fuel-air cycle and air- standard cycle for all practical applications  |
| C02              | Explain working principle and various components of IC engine   |
| C03              | Explain combustion phenomenon of CI and SI engines and their impact on engine variables   |
| C04              | Analyse the performance of an IC engine based on the performance parameters   |
| C05              | Explain the cycles and systems of a gas turbine and determine the efficiency of gas turbine   |
| <b>III-I SEM</b> | <b>Course : Thermal Engineering Lab</b>   |
| C01              | perform I.C. Engines valve and port timing diagrams   |
| C02              | perform I.C. Engine heat balance at different loads and show the heat distribution curve  |
| C03              | perform Study of boilers, mountings and accessories   |
| <b>III-I SEM</b> | <b>Course : Theory Of Machines Lab</b>  |
| C01              | determine whirling speed of shaft theoretically and experimentally  |
| C02              | determine the frequency of damped force vibration of a spring mass system   |
| C03              | Teach simple and compound screw jack and determine the mechanical advantage , velocity ratio and efficiency   |
| <b>III-I SEM</b> | <b>Course : Mechanical Measurements &amp; Metrology Lab</b>   |
| C01              | Explain about Metrology Lab   |
| C02              | Explain about Mechanical Measurements Lab   |
| C03              | Measurements of different Parameteres   |





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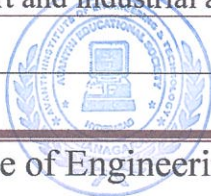
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| <b>III-II SEM</b> | <b>Course : Operations Research</b>  |
| C01               | Formulate the resource management problems and identify appropriate methods to solve them  |
| C02               | Apply LPP, transportation and assignment models to optimize the industrial resources   |
| C03               | Solve decision theory problems through the application of game theory  |
| C04               | Apply the replacement and queuing models to increase the efficiency of the system  |
| C05               | Model the project management problems through CPM and PERT   |
|                   |  |
| <b>III-II SEM</b> | <b>Course : Heat Transfer</b>  |
| C01               | Compute rate of heat transfer for 1D, steady state composite systems without heat generation   |
| C02               | Analyze the system with heat generation, variable thermal conductivity, fins and 1D transient conduction heat transfer problems  |
| C03               | Develop the empirical equations for forced convection problems by using Buckingham's pi theorem  |
| C04               | Compute the rate of heat transfer for natural convection systems and design and analysis of heat exchangers  |
| C05               | Solve the heat transfer systems with phase change and radiation  |
|                   |  |
| <b>III-II SEM</b> | <b>Course : CAD/CAM</b>  |
| C01               | Describe the mathematical basis in the technique of representation of geometric entities including points, lines, and parametric curves, surfaces and solid, and the technique of transformation of geometric entities using transformation matrix |
| C02               | Describe the use of GT and CAPP for the product development  |
| C03               | Identify the various elements and their activities in the Computer Integrated Manufacturing Systems  |
|                   |  |
| <b>III-II SEM</b> | <b>Course : Refrigeration And Air Conditioning</b>   |
| C01               | Differentiate between different types of refrigeration systems with respect to engineering applications  |
| C02               | Analyse refrigeration and air conditioning systems and evaluate performance parameters   |
| C03               | Apply the principles of Psychometrics to design the air conditioning loads for the industrial applications   |
| C04               | perform cooling load calculations and select the appropriate process and equipment for the required comfort and industrial air-conditioning  |
|                   |  |







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| <b>III-II SEM</b> | <b>Course : Unconventional Machining Processes</b>   |
| C01               | Explain the characteristics and importance of different types of unconventional machining processes  |
| C02               | Identify the appropriate unconventional machining process for the implementation in a typical industrial scenario based on the applications            |
| C03               | discuss the significance of tools and resources used for machining the components in unconventional machining  |
| C04               | Machine the components through ECM / EDM and other machining processes   |
| C05               | Perform experiments in the advanced unconventional machining processes such as laser beam machining and electron beam machining                        |
| <b>III-II SEM</b> | <b>Course : Automobile Engineering</b>   |
| C01               | Describe the basic lay-out of an automobile and its components and enlist the emission standards of an automobile                                      |
| C02               | Describe different engine cooling, lubrication, ignition, electrical and air conditioning systems and suggest suitable systems for a given application |
| C03               | Explain the principles of transmission, suspension, steering and braking systems   |
| C04               | Describe various fuel supply systems in SI and CI engines  |
| <b>III-II SEM</b> | <b>Course : Simulation Of Mechanical Systems Lab</b>   |
| C01               | perform Mass-Spring-Damper with controller   |
| C02               | perform Double Mass-Spring- Damper   |
| C03               | perform Simple Mechanical System   |
| <b>III-II SEM</b> | <b>Course : Heat Transfer Lab</b>  |
| C01               | Determine of overall heat transfer co-efficient of a composite slab  |
| C02               | Determine of efficiency of a pin-fin   |
| C03               | Determine of critical heat flux  |
| <b>III-II SEM</b> | <b>Course : CAD/CAM Lab</b>  |
| C01               | draw the modelling tools in creating 2D and 3D drawings  |
| C02               | use tools for any engineering and real time applications   |
| C03               | impart knowledge on utilizing these tools for a better project   |
| <b>IV-I SEM</b>   | <b>Course : Industrial Management</b>  |





# 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

|                 |   |
|-----------------|---|
| C01             | design and conduct experiments, analyse, interpret data and synthesize valid conclusions  |
| C02             | design a system, component, or process, and synthesize solutions to achieve desired needs   |
| C03             | use the techniques, skills, and modern engineering tools necessary for engineering practice with appropriate considerations for public health and safety, cultural, societal, and environmental constraints |
| C04             | function effectively within multi-disciplinary teams and understand the fundamental precepts of effective project management  |
|                 |   |
| <b>IV-I SEM</b> | <b>Course : Finite Element Methods</b>  |
| C01             | Explain the concepts behind variational methods and weighted residual methods in FEM  |
| C02             | Identify the application and characteristics of FEA elements such as bars, beams, plane and isoparametric elements, and 3-D element   |
| C03             | Develop element characteristic equation procedure and generate global equations   |
| C04             | apply Suitable boundary conditions to global equations, and reduce it to a solvable form  |
| C05             | apply the FE procedure to field problems like heat transfer   |
|                 |   |
| <b>IV-I SEM</b> | <b>Course : Production Planning &amp; Control</b>   |
| C01             | Apply the systems concept for the design of production and service systems  |
| C02             | Make forecasts in the manufacturing and service sectors using selected quantitative and qualitative techniques  |
| C03             | Apply the principles and techniques for planning and control of the production and service systems to optimize/make best use of resources   |
| C04             | Discuss importance and function of inventory and to be able to apply selected techniques for its control and management under dependent and independent demand circumstances                                |
|                 |   |
| <b>IV-I SEM</b> | <b>Course : Power Plant Engineering</b>   |
| C01             | Compare various conventional methods of power generation  |
| C02             | Discuss the principle of operation and performance of respective prime movers along with their economics and their impact on environment  |
| C03             | Teach the power plant instrumentation and control   |
|                 |   |
| <b>IV-I SEM</b> | <b>Course : Nano Technology</b>   |
| C01             | Explain the basic concepts of nanotechnology  |
| C02             | Teach the synthesis of nanomaterials and their application  |





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|                  |   |
|------------------|---|
| C03              | Apply their learned knowledge to develop Nanomaterial's   |
|                  |   |
| <b>IV-I SEM</b>  | <b>Course : Finite Element Simulation Lab</b>   |
| C01              | Determine deflection and stresses in 2D and 3D trusses and beams  |
| C02              | Determine deflections component and principal and Von-mises stresses in plane   |
| C03              | Derive stress, plane strain and Axisymmetric components   |
|                  |   |
| <b>IV-II SEM</b> | <b>Course : Additive Manufacturing</b>  |
| C01              | Outline LIQUID-BASED RAPID PROTOTYPING SYSTEMS  |
| C02              | Outline SOLID-BASED RAPID PROTOTYPING SYSTEMS   |
| C03              | Outline POWDER BASED RAPID PROTOTYPING SYSTEMS  |
| C04              | Outline RAPID TOOLING   |
| C05              | Outline RAPID PROTOTYPING DATA FORMATS  |
|                  |   |
| <b>IV-II SEM</b> | <b>Course : Gas Dynamics And Jet Propulsion</b>   |
| C01              | Illustrate fluid flow systems   |
| C02              | analyze the isotropic flow of an ideal gas and its parameter  |
| C03              | Solve simple frictional flow with heat transfer problems  |
| C04              | Analyze the impact of heat transfer on flow parameters  |
| C05              | evaluatedifferent propulsion systems  |
|                  |   |
| <b>IV-II SEM</b> | <b>Course : Product Design And Development</b>  |
| C01              | Apply the principles of generic development process; conduct customer need analysis; and set product specification for new product design and development |
| C02              | Generate, select, screen, and test concepts for new product design and development  |
| C03              | Apply the principles of product architecture and industrial design to design and develop new products   |
| C04              | Apply the principles of DFMA and Prototyping to design and develop new product  |
| C05              | Apply the concepts of economics principles sustainable product development and life cycle assessment  |
|                  |   |
| <b>IV-II SEM</b> | <b>Course : Reliability Engineering</b>   |
| C01              | Explain the basic concepts of Reliability Engineering and its Understand measures   |





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|                   |   |
|-------------------|---|
| C02               | Predict the Reliability at system level using various models  |
| C03               | Design the test plan to meet the reliability Requirements   |
| C04               | Predict and estimate the reliability from failure data  |
| C05               | Develop and implement a successful Reliability programme  |
|                   |   |
| <b>IV-II SEM</b>  | <b>Course : Destructive Evaluation</b>  |
| C01               | Explain techniques and methods of non-destructive testing   |
| C02               | Apply methods knowledge of non destructive testing to evaluate products of railways, automobiles, aircrafts, chemical industries etc.     |
|                   |   |
| <b>IV-II SEM</b>  | <b>Course : Total Quality Management</b>  |
| C01               | realize the importance of significance of quality   |
| C02               | Manage quality improvement teams  |
| C03               | Identify requirements of quality improvement programs   |
|                   |   |
| <b>IV Sem -II</b> | <b>Course : Project</b>   |
| CO-1              | Formulate., and apply mathematical, science and engineering principles to solve real time engineering problems                            |
| CO-2              | Test the existing data, communicate and conduct research on complex problems using modern tools   |
| CO-3              | Validate the obtained results on contemporary issues related to society and environment   |
| CO-4              | Determine effectively the engineering principles used intheir project individually and as a team as per the norms of engineering practice |
| CO-5              | Structure future work to promote life long learning in the context of technological adaptation.   |



  
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