VGNT

Subjectwise Course Outcome - [Mechanical Engineering - 2020-21]

M E 2-1 (Div - A)	
C201 Probability and Statistics & Complex Variables [Theory | Regular]	
CO ID.	**Course Outcome**
C201.1	Students must be able to apply the Baye's theorem to solve rea world problems.
C201.2	Students must be able to understand Probability Distributions.
C201.3	Students must be able to Test the Hypothesis whether to accept it, or to reject.
C201.4	Students must be able to analyze analytical functions.
C201.5	students must be able to integrate a complex function over a simple closed curves.
C202 Mechanics of Solids [Theory | Regular]	
CO ID.	**Course Outcome**
C202.1	Analyze the behavior of the solid bodies subjected to various types ofloading;
C202.2	Apply knowledge of materials and structural elements to the analysis of simple structures
C202.3	Undertakeproblemidentification,formulationandsolutionusingarangeofanalyticalmethods
C202.4	Analyze and interpret laboratory data relating to behavior of structures and the materials they are made of, and undertake associated laboratory work individually and inteams.
C202.5	Expectation and capacity to undertake lifelonglearning
C203 Material Science and Metallurgy [Theory | Regular]	
CO ID.	**Course Outcome**
C203.1	Identify various crystal imperfections, deformation mechanisms, strengthening mechanisms, demonstrate understanding of various failure mechanisms of materials and illustrate basics of Ceramics.
C203.2	Interpret Iron-Iron carbide phase diagram, and different phases in microstructures of materials at different conditions.
C203.3	Select appropriate heat treatment process for specific applications.
C203.4	Understanding the interpretation of final microstructures and properties and also to select appropriate hardening process for specific applications.
C203.5	Identify effect of alloying elements on properties of steels and understanding the concepts of Ferrous alloys and Non Ferrous alloys.
C204 Production Technology [Theory | Regular]	
CO ID.	**Course Outcome**
C204.1	Students will be able to demonstrate understanding of casting process
C204.2	Students will be able to understand the various types of welding process
C204.3	Demonstrate applications of various types of welding processes
C204.4	Illustrate principles of forming processes
C204.5	Students will be able to understand the extrusion of metals,forging process and high energy rate forming processes
C205 Thermodynamics [Theory | Regular]	
CO ID.	**Course Outcome**
C205.1	the student should be able to Understand and differentiate between different thermodynamic systems and processes
C205.2	Understand and apply the laws of Thermodynamics to different types of systems undergoing various processes and to perform thermodynamic analysis.
C205.3	Understand and analyse the Thermodynamic cycles and evaluate performance parameters.
C205.4	Student should able to understand Entropy and its application and able to understand Gas Laws
C205.5	Ability to relate the characteristics of Psychrometry, Student should understand Numerical treatment using Psychometric chart & Thermodynamics of Human Body and Comfort Conditions Course
C206 Constitution of India [Theory | Regular]	
CO ID.	**Course Outcome**

C206.1	Understand the emergence and evolution of Indian Constitution
C206.2	Understand the structure and composition of Indian Constitution
C206.3	Understand and analyse federalism in the Indian context
C206.4	Analyse Panchayathi Raj institutions as a medium of decentralization
C206.5	Understand and analyse the three organs of the state in the contemporary scenario.
C207 Machine Drawing Practice [Practical | Regular]	
CO ID.	**Course Outcome**
C207.1	To learn machine drawing conventions and convention representation of materials.
C207.2	To draw the machine elements and simple parts.
C207.3	To learn and drawing of various Engine Parts.
C207.4	To learn,analyze and draw various machine parts.
C207.5	To learn,analyze and draw various valves and valves parts
C208 Material Science and Mechanics of Solids Lab [Practical | Regular]	
CO ID.	**Course Outcome**
C208.1	Analyze the behavior of the solid bodies subjected to various types of loading
C208.2	Apply knowledge of materials and structural elements to the analysis of simple structures.
C208.3	Undertake problem identification, formulation and solution using a range of analytical methods
C208.4	Analyze and interpret laboratory data relating to behavior of structures and the materials they are made of, and undertake associated laboratory work individually and in teams.
C208.5	Expectation and capacity to undertake lifelong learning.
C209 Production Technology Lab [Practical | Regular]	
CO ID.	**Course Outcome**
C209.1	Understanding the properties of moulding sands.
C209.2	Fabricate joints using gas welding and arc welding
C209.3	Evaluate the quality of welding joints
C209.4	Basic idea of press working tools and performs moulding studies on plastics
C209.5	Understanding the use of Pattern design and making.
M E 3-1 (Div - A)	
C301 Business Economics & Financial Analysis [Theory | Regular]	
CO ID.	**Course Outcome**
C301.1	Students get familiarized with Business Economics
C301.2	Students get an insight into the consumer behavior and demand and supply determinants and market equilibrium
C301.3	Get an understanding about the optimum utilization of resources and cost and volume analysis under perfect competition
C301.4	Gain expertise in preparation of financial statements
C301.5	Knowledge about interpretation of financial statements by using ratio analysis
C302 Dynamics of Machinery [Theory | Regular]	
CO ID.	**Course Outcome**
C302.1	Analyze the effect of a gyroscope on ships, Aero planes and automobile
C302.2	Explain the working of important machine elements like clutches, brakes, flywheels, governors.
C302.3	Analyze the theory involved in balancing of rotating and reciprocating members
C302.4	Estimate the unbalanced forces in a multi-cylinder reciprocating engine
C302.5	Understand longitudinal, transverse and torsional vibrations so as to avoid resonance
C303 Design of Machine Members - I [Theory | Regular]	
CO ID.	**Course Outcome**

C303.1	Students acquires the knowledge about the principles of design,material selection and design for simple and compound loading, understanding the theories of failures.
C303.2	Students get the knowledge about the design principles of stress concentration and fluctuating loads.
C303.3	Understanding the design procedure of joints like riveted joints,bolted joints & welded joints
C303.4	Students acquires the knowledge about the design procedure of shaft keys,cotter joints and knuckle joints.
C303.5	Students acquire the knowledge about the design procedure of shafts under complex loading and the design procedure of shaft couplings.
C304 Metrology and Machine Tools [Theory | Regular]	
CO ID.	Course Outcome
C304.1	Understand mechanics of metal cutting process
C304.2	Understand working of lathe machine
C304.3	Understand working of milling & drilling machine
C304.4	Understand the concept of limits,fits,tolerance and identify the methods & devices for measurement of length, angle.
C304.5	Identify methods and devices for measurement of surface roughness,gear measurement,thread measurement and understand working of CMM.
C305 Thermal Engineering -II [Theory | Regular]	
CO ID.	Course Outcome
C305.1	1.Develop State-- Space Diagrams Based On The SchematicDiagrams Of Process Flow Of Steam And Gas Turbine Plants
C305.2	2.Apply The Laws Of Thermodynamics To AnalyzeThermodynamic Cycles
C305.3	3.Differentiate Between Vapour Cycles And Gas Power Cycles
C305.4	4.Infer From Property Charts And Tables And To Apply The DataFor The Evaluation Of Performance Parameters Of The SteamAnd Gas Turbine Plants
C305.5	5.Understand The Functionality Of Major Components Of SteamAnd Gas Turbine Plants And To Do The Analysis Of TheseComponents
C306 Operation Research [Theory | Regular]	
CO ID.	Course Outcome
C306.1	Understanding the problem (formulation)- Analyze any real life system with limited constraints and depict it in a model form.
C306.2	Identifying variables and constraints - for the problem in study
C306.3	formulas of optimization model (Model Building)
C306.4	Apply appropriate optimisation technique
C306.5	Understand the importance of development of a mathematical model
C307 INTELLECTUAL PROPERTY RIGHTS [Theory | Regular]	
CO ID.	Course Outcome
C307.1	The student can be able to know and understand the importance, federal registration and types of intellectual property rights
C307.2	The student can be able to explain the trademark evaluation and registration process
C307.3	The student can understand describe the fundamentals of copyright law and illustrate international copyright law with respect to ownership and registration of copyrights
C307.4	The student can be able to describe Trade secret law and determine trade secret status and describe misappropriation right of publicity
C307.5	The student can be able to understand international trademark law, copyright law, patent law and trade secret law and describe new developments in trade
C308 Thermal Engineering Lab [Practical | Regular]	
CO ID.	Course Outcome
C308.1	To understand the working principles of 4 stroke SI Engine.
C308.2	To understand the working principles of 2 stroke SI Engine.
C308.3	To understand the working principles of 4-stroke CI Engines
C308.4	To understand the working principles of 4-stroke 4 cylinder SI engine
C308.5	To understand the working principles of VCR engine
C308.6	To understand the working principles of 2-stage reciprocating Compressors.
C308.7	To understand the working principles of IC Engines, Compressors.

C308.8	To understand the working principles of boiler models
C309 Metrology & Machine tools Lab [Practical | Regular]	
CO ID.	Course Outcome
C309.1	Apply the procedures to measure length, width, depth, bore diameters, internal and external tapers, tool angles, and surface roughness by using different instruments.
C309.2	Measure effective diameter of Thread profile using different methods
C309.3	Perform step, taper turning, knurling and threading.
C309.4	To understand and Measure the linear measuring instruments
C309.5	To measure the angle by sine bar and universal bevel
C310 Kinematics & Dynamics lab [Practical | Regular]	
CO ID.	Course Outcome
C310.1	Understand the different type of vibrations for calculating the time period,frequency and amplitude.
C310.2	Understand the different followers for different cams
C310.3	Students can able to know the balancing of mass systems
C310.4	Find out the time period & natural frequency of simple and compound pendulum
C310.5	Determine the effect of gyroscope for different conditions
C310.6	Understand the Journal bearing to calculate the pressure distribution
M E 3-1 (Div - B)	
C301 Business Economics & Financial Analysis [Theory | Regular]	
CO ID.	Course Outcome
C301.1	Students get introduced to business economics and the various micro and macro economic concepts
C301.2	Get familiar with the determinants of demand and supply and market equilibrium
C301.3	Gain an understanding about optimum utilization of resources and cost and volume analysis under perfect competition
C301.4	Expertise in preparation of financial statements
C301.5	Proficient in analyzing the financial statements using ratio analysis
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CO ID.	Course Outcome
C302.1	Analyze the effect of a gyroscope on ships, aeroplanes and automobile
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C303 Design of Machine Members - I [Theory | Regular]	
CO ID.	Course Outcome
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C303.2	Students get knowledge about the design principles of stress concentration and fluctuating loads.
C303.3	Understanding the design procedure of joints like riveted joints,bolted joints & welded joints
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C303.5	Students acquires the knowledge about the design procedure of shafts under complex loading and the design procedure of shaft couplings.
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CO ID.	Course Outcome
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C304.2	Understand working of lathe machine
C304.3	Understand working of milling & drilling machine

C304.4	Understand the concept of limits,fits,tolerance and identify the methods & devices for measurement of length, angle.
C304.5	Identify methods and devices for measurement of surface roughness,gear measurement,thread measurement and understand working of CMM.
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C305.2	2.Apply The Laws Of Thermodynamics To AnalyzeThermodynamic Cycles
C305.3	3.Differentiate Between Vapour Cycles And Gas Power Cycles
C305.4	4.Infer From Property Charts And Tables And To Apply The DataFor The Evaluation Of Performance Parameters Of The SteamAnd Gas Turbine Plants
C305.5	5.Understand The Functionality Of Major Components Of SteamAnd Gas Turbine Plants And To Do The Analysis Of TheseComponents
C306 Operation Research [Theory | Regular]	
CO ID.	Course Outcome
C306.1	Understanding the problem (formulation)- Analyze any real life system with limited constraints and depict it in a model form.
C306.2	Identifying variables and constraints - for the problem in study
C306.3	formulas of optimization model (Model Building)
C306.4	Apply appropriate optimisation technique
C306.5	Understand the importance of development of a mathematical model
C307 INTELLECTUAL PROPERTY RIGHTS [Theory | Regular]	
CO ID.	Course Outcome
C307.1	The student can be able to know and understand the importance, federal registration and types of intellectual property rights
C307.2	The student can be able to explain the trademark evaluation and registration process
C307.3	The student can understand describe the fundamentals of copyright law and illustrate international copyright law with respect to ownership and registration of copyrights
C307.4	The student can be able to describe Trade secret law and determine trade secret status and describe misappropriation right of publicity
C307.5	The student can be able to understand international trademark law, copyright law, patent law and trade secret law and describe new developments in trade
C308 Thermal Engineering Lab [Practical | Regular]	
CO ID.	Course Outcome
C308.1	To understand the working principles of 4 stroke SI Engine.
C308.2	To understand the working principles of 2 stroke SI Engine.
C308.3	To understand the working principles of 4-stroke CI Engines.
C308.4	To understand the working principles of 4-stroke 4 cylinder SI engine.
C308.5	To understand the working principles of VCR engine.
C308.6	To understand the working principles of 2-stage reciprocating Compressors.
C308.7	To understand the working principles of IC Engines, Compressors.
C308.8	To understand the working principles of boiler models.
C309 Metrology & Machine tools Lab [Practical | Regular]	
CO ID.	Course Outcome
C309.1	To demonstrate knowledge of different machine tools used in machine shop
C309.2	Able to know the Perform of lathe operations like step, taper turning, knurling and threading.
C309.3	To Produce smooth surface finish using grinding machine.
C309.4	To find out addendum and tooth thickness by using gear tooth vernier callipers
C309.5	To find out angle and taper of the wedge by using sine bar and bevel protractor
C310 Kinematics & Dynamics lab [Practical | Regular]	
CO ID.	Course Outcome
C310.1	Understand the different type of vibrations for calculating the time period,frequency and amplitude.

C310.2	Understand the different followers for different cams
C310.3	Students can able to know the balancing of mass systems
C310.4	Find out the time period & natural frequency of simple and compound pendulum
C310.5	Determine the effect of gyroscope for different conditions
C310.6	Understand the Journal bearing to calculate the pressure distribution

M E 4-1 (Div - A)

C401 CAD/CAM [Theory | Regular]

CO ID.	Course Outcome
C401.1	Students will be able to understand fundamental of CAD/CAM,geometric transformation techniques in CAD & Develop mathematical models to represent curves
C401.2	Students will be able to develop mathematical models to represent surfaces & model engineering components using solid modeling techniques.
C401.3	Students will be able to develop programs for CNC to manufacture industrial components as well as they will understand the concept of adaptive control system in manufacturing system
C401.4	Students will be able to understand about group technology, computer aided process planning and computer aided manufacturing resource planning
C401.5	Students will understand about Flexible manufacturing system, Computer aided quality control & Computer Integrated Manufacturing system

C402 Instrumentation and Control System [Theory | Regular]

CO ID.	Course Outcome
C402.1	To identify various elements and their purpose in typical instruments
C402.2	To identify various errors that would occur in instruments.
C402.3	Analysis of errors so as to determine correction factors for each an instrument.
C402.4	To understand static and dynamic characteristics of instrument and should be able to determine loading response time
C402.5	For given range of displacement should be able to specify transducer, it accurate and loading time of that transducer

C403 Composite Materials [Theory | Elective]

CO ID.	Course Outcome
C403.1	Classify various types of composite materials. Describe the applications of composite materials. Explain the roles of reinforcement and matrix in a composite material.
C403.2	Demonstrate the preparation, layup and curing of composites. Compare characteristics of various reinforcements. Formulate methods to compute properties of composites
C403.3	Choose, recommend and describe the manufacturing methods of Polymer Matrix Composites.
C403.4	Choose, recommend and describe the manufacturing methods of Metal Matrix Composites.
C403.5	Choose, recommend and describe the manufacturing methods of Ceramic Matrix Composites and Carbon - Carbon Composites

C404 Additive Manufacturing Technology [Theory | Elective]

CO ID.	Course Outcome
C404.1	Describe various CAD issues for 3D printing and rapid proto typing, related operations for STL model manipulation.
C404.2	Formulate and solve typical problems on reverse engineering for surface reconstruction from physical proto type models through digitizing and spline based surface fitting.
C404.3	Formulate and solve typical problems on reverse engineering for surface re construction from digitized mesh models through topological modeling and sub division surface fitting.
C404.4	Explain and summarize the principles and key characteristics AMT and commonly 3D Printing and AMS.
C404.5	Explain and summarize typical rapid tooling process for quick batch production of plastic and metal parts applications.

C405 Robotics [Theory | Elective]

CO ID.	Course Outcome
C405.1	students will be able to demonstrate the basic functioning and construction of a robot.
C405.2	students will be able to learn about robot kinematics and various transformation techniques of robots.
C405.3	students will be able to carryout dynamic analysis, work space analysis and trajectory planning for a robot.
C405.4	students will be able to identify suitable sensors or actuators for robot
C405.5	students will be able to select an appropriate robot for given industrial inspections and material handling systems and process applications

C406 CAD/CAM Lab [Practical | Regular]	
CO ID.	Course Outcome
C406.1	Convert 3D solid models into 2D drawing-different views, sections
C406.2	Execute steps required for modeling 3D objects by using protrusion, cut, sweep, extrude commands
C406.3	Use isometric views and dimensioning of part models
C406.4	Machine simple components on CNC machines
C406.5	Use CAM software to generate NC code
C407 Instrumentation and Control Systems Lab [Practical | Regular]	
CO ID.	Course Outcome
C407.1	An ability to apply the principles of uncertainty to data analysis from instrument measurement of a variety of properties.
C407.2	An ability to operate instruments and measurement systems to measure the properties of temperature, viscosity, pressure, flow and strain
C407.3	An ability to apply the principles of digital sampling and signal conditioning to measurement instruments.
C407.4	An ability to write reports describing experimental setups, data collection, data analysis and data presentation
C407.5	An ability to synthesize an individual automated data acquisition project, work in groups and present results to a group.
C408 Seminar [Practical | Regular]	
CO ID.	Course Outcome
C408.1	To study research papers for understanding of a new field, in the absence of a textbook , to summarize and review them.
C408.2	To identify promising new directions of various cutting edge technologies
C408.3	To impart skills in preparing detailed report describing the project and results
C408.4	To effectively communicate by making an oral presentation before an evaluation committee
C409 Industry Oriented Mini Project [Practical | Regular]	
CO ID.	Course Outcome
C409.1	To enable the students to develop comprehensive solution to issues identified in previous semester work and to meet the requirements as stated in project brief.
C409.2	To inculcate the ability to synthesize the results of the detailed analytical studies conducted, lay down validity and design criteria, interpret the result for application to the problem, develop the concept and detailed design solution and to effectively communicate the thesis rationale.
C409.3	To impart skills in preparing detailed report describing the project and results
C409.4	To effectively communicate by making an oral presentation before an evaluation committee
M E 4-1 (Div - B)	
C401 CAD/CAM [Theory | Regular]	
CO ID.	Course Outcome
C401.1	Students will be able to understand fundamental of CAD/CAM,geometric transformation techniques in CAD & Develop mathematical models to represent curves
C401.2	Students will be able to develop mathematical models to represent surfaces & model engineering components using solid modeling techniques.
C401.3	Students will be able to develop programs for CNC to manufacture industrial components as well as they will understand the concept of adaptive control system in manufacturing system
C401.4	Students will be able to understand about group technology, computer aided process planning and computer aided manufacturing resource planning
C401.5	Students will understand about Flexible manufacturing system, Computer aided quality control & Computer Integrated Manufacturing system
C402 Instrumentation and Control System [Theory | Regular]	
CO ID.	Course Outcome
C402.1	To identify various elements and their purpose in typical instruments
C402.2	To identify various errors that would occur in instruments.
C402.3	Analysis of errors so as to determine correction factors for each an instrument.
C402.4	To understand static and dynamic characteristics of instrument and should be able to determine loading response time
C402.5	For given range of displacement should be able to specify transducer, it accurate and loading time of that transducer
C403 Composite Materials [Theory | Elective]	

CO ID.	Course Outcome
C403.1	Classify various types of composite materials. Describe the applications of composite materials. Explain the roles of reinforcement and matrix in a composite material.
C403.2	Demonstrate the preparation, layup and curing of composites. Compare characteristics of various reinforcements. Formulate methods to compute properties of composites
C403.3	Choose, recommend and describe the manufacturing methods of Polymer Matrix Composites.
C403.4	Choose, recommend and describe the manufacturing methods of Metal Matrix Composites.
C403.5	Choose, recommend and describe the manufacturing methods of Ceramic Matrix Composites and Carbon - Carbon Composites

C404 Additive Manufacturing Technology [Theory | Elective]

CO ID.	Course Outcome
C404.1	Describe various CAD issues for 3D printing and rapid proto typing, related operations for STL model manipulation.
C404.2	Formulate and solve typical problems on reverse engineering for surface reconstruction from physical proto type models through digitizing and spline based surface fitting.
C404.3	Formulate and solve typical problems on reverse engineering for surface re construction from digitized mesh models through topological modeling and sub division surface fitting.
C404.4	Explain and summarize the principles and key characteristics AMT and commonly 3D Printing and AMS.
C404.5	Explain and summarize typical rapid tooling process for quick batch production of plastic and metal parts applications.

C405 Robotics [Theory | Elective]

CO ID.	Course Outcome
C405.1	students will be able to demonstrate the basic functioning and construction of a robot.
C405.2	students will be able to learn about robot kinematics and various transformation techniques of robots.
C405.3	students will be able to carryout dynamic analysis, work space analysis and trajectory planning for a robot.
C405.4	students will be able to identify suitable sensors or actuators for robot
C405.5	students will be able to select an appropriate robot for given industrial inspections and material handling systems and process applications

C406 CAD/CAM Lab [Practical | Regular]

CO ID.	Course Outcome
C406.1	Execute steps required for modeling 3D objects by using protrusion, cut, sweep,extrude commands
C406.2	Convert 3D solid models into 2D drawing-different views, sections,Use isometric views and dimensioning of part models,Modeling of simple machine parts and assemblies from the part drawings using standardCAD packages.
C406.3	Practically deterimind deflection of 2d,3d truss of beam by useing analysis softeare
C406.4	how to deterimind failure theories of palnes and axi-symmetric componentes by useing ansys
C406.5	how to determind the stress in shell elements by useing ansys software
C406.6	vibrational analysis of 2d beam, calculate natural frequencies, harmonic graphs
C406.7	how to determine the heat transfer modes through axi-symmetric components
C406.8	how to Machine simple components on CNC machines, Use CAM software to generate NC code
C406.9	Understanding process planning, Rapid Manufacturing
C406.10	Generate CNC Turning and Milling codes for different operations using standard CAMpackages. Write manual part programming using ISO codes for turning and millingoperations

C407 Instrumentation and Control Systems Lab [Practical | Regular]

CO ID.	Course Outcome
C407.1	An ability to apply the principles of uncertainty to data analysis from instrument measurement of a variety of properties.
C407.2	An ability to operate instruments and measurement systems to measure the properties of temperature, viscosity, pressure, flow and strain
C407.3	An ability to apply the principles of digital sampling and signal conditioning to measurement instruments.
C407.4	An ability to write reports describing experimental setups, data collection, data analysis and data presentation
C407.5	An ability to synthesize an individual automated data acquisition project, work in groups and present results to a group.

C408 Seminar [Practical | Regular]

CO ID.	Course Outcome

C408.1	To study research papers for understanding of a new field, in the absence of a textbook , to summarize and review them.
C408.2	To identify promising new directions of various cutting edge technologies
C408.3	To impart skills in preparing detailed report describing the project and results
C408.4	To effectively communicate by making an oral presentation before an evaluation committee

C409 Industry Oriented Mini Project [Practical | Regular]	
CO ID.	**Course Outcome**
C409.1	To enable the students to develop comprehensive solution to issues identified in previous semester work and to meet the requirements as stated in project brief.
C409.2	To inculcate the ability to synthesize the results of the detailed analytical studies conducted, lay down validity and design criteria, interpret the result for application to the problem, develop the concept and detailed design solution and to effectively communicate the thesis rationale.
C409.3	To impart skills in preparing detailed report describing the project and results
C409.4	To effectively communicate by making an oral presentation before an evaluation committee

M E 4-1 (Div - C)

C401 CAD/CAM [Theory | Regular]	
CO ID.	**Course Outcome**
C401.1	Students will be able to understand fundamental of CAD/CAM,geometric transformation techniques in CAD & Develop mathematical models to represent curves
C401.2	Students will be able to develop mathematical models to represent surfaces & model engineering components using solid modeling techniques.
C401.3	Students will be able to develop programs for CNC to manufacture industrial components as well as they will understand the concept of adaptive control system in manufacturing system
C401.4	Students will be able to understand about group technology, computer aided process planning and computer aided manufacturing resource planning
C401.5	Students will understand about Flexible manufacturing system, Computer aided quality control & Computer Integrated Manufacturing system

C402 Instrumentation and Control System [Theory | Regular]	
CO ID.	**Course Outcome**
C402.1	To identify various elements and their purpose in typical instruments
C402.2	To identify various errors that would occur in instruments.
C402.3	Analysis of errors so as to determine correction factors for each an instrument.
C402.4	To understand static and dynamic characteristics of instrument and should be able to determine loading response time.
C402.5	For given range of displacement should be able to specify transducer, it accurate and loading time of that transducer.

C405 Robotics [Theory | Elective]	
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C405.1	students will be able to demonstrate the basic functioning and construction of a robot.
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C405.3	students will be able to carryout dynamic analysis, work space analysis and trajectory planning for a robot.
C405.4	students will be able to identify suitable sensors or actuators for robot
C405.5	students will be able to select an appropriate robot for given industrial inspections and material handling systems and process applications

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C406.1	Execute steps required for modeling 3D objects by using protrusion, cut, sweep,extrude commands
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C407.4	An ability to write reports describing experimental setups, data collection, data analysis and data presentation
C407.5	An ability to synthesize an individual automated data acquisition project, work in groups and present results to a group.

C408 Seminar [Practical | Regular]	
CO ID.	Course Outcome
C408.1	To understand the presentation skills
C408.2	To collect the topic regarding Presntation
C408.3	To understand the current scenario relevant field

C409 Industry Oriented Mini Project [Practical | Regular]	
CO ID.	Course Outcome
C409.1	To enable the students to develop comprehensive solution to issues identified in previous semester work and to meet the requirements as stated in project brief.
C409.2	To inculcate the ability to synthesize the results of the detailed analytical studies conducted, lay down validity and design criteria, interpret the result for application to the problem, develop the concept and detailed design solution and to effectively communicate the thesis rationale.
C409.3	To impart skills in preparing detailed report describing the project and results
C409.4	To effectively communicate by making an oral presentation before an evaluation committee

C410 Power Plant Engineering [Theory | Elective]	
CO ID.	Course Outcome
C410.1	To make the student aware of different energy sources on offer for electricity generation and their potential in India and the layout & engineering design of the conventional coal-based thermal system and its sub-systems.
C410.2	To make the student knowledgeable on the working principles of IC engine, gas turbine, combined cycle-based systems and also on systems for direct conversion of energy to electricity.
C410.3	To make the student identify the renewable energy sources which might be conventional or unconventional systems for the generation of electricity.
C410.4	To make the student understand the application of Nuclear technology for electric power generation and resultant waste for disposal & protection from radiation.
C410.5	To make the student assimilate the importance of the economic, environmental, and regulatory issues associated with electric power generation.

C411 Turbo Machine [Theory | Elective]	
CO ID.	Course Outcome
C411.1	Ability to apply thermodynamic concepts to analyze turbo machines and to design, calculate different parameters for turbo machines.
C411.2	Ability to understand thermodynamics and kinematics behind steam nozzles and steam turbines
C411.3	Ability to analyze the Flow over flat surfaces and analyze centrifugal flow turbo machines for energy transfer
C411.4	Analyze axial flow turbo machines for energy transfer and analyze the Flow through cascades
C411.5	To acquire the knowledge and skill of analyzing Gas Turbine Cycles and to evaluate the various losses in the turbines

M E 2-2 (Div - A)	

C210 BASIC ELECTRICAL & ELECTRONICS ENGINEERING [Theory | Regular]	
CO ID.	Course Outcome
C210.1	Solve electrical circuits using network laws and theorems
C210.2	Apply the installation steps for electrical appliance and calculate electricity bi
C210.3	Analyze the various electrical machines for different applications

C210.4	Draw the characteristics of diodes and design the filters for rectifiers
C210.5	Draw the characteristics of various types of Transistor
C211 KINEMATICS OF MACHINERY [Theory | Regular]	
CO ID.	Course Outcome
C211.1	Discriminate mobility; enumerate links and joints in the mechanisms.
C211.2	Analyze a mechanism for displacement, velocity and acceleration of links in a machine.
C211.3	To understand the working of various straight line mechanisms and steering gear mechanisms
C211.4	Students are able to understand the design mechanisms of basic cam systems for different machinery.
C211.5	To understand the basic concepts of toothed gearing, kinematics of gear trains and the effects of friction in motion transmission and in machine components.
C212 THERMAL ENGINEERING-I [Theory | Regular]	
CO ID.	Course Outcome
C212.1	Describe the functions of different components of I.C engines and understand the properties of fuels.
C212.2	Analyze the combustion process of fuels in spark ignition and compression ignition engines.
C212.3	Derive the performance characteristics of IC engines and evaluate the performance of IC engines under the given operating conditions.
C212.4	Evaluate the performance characteristics of the compressors under given operating conditions.
C212.5	Apply the laws of Thermodynamics to evaluate the performance of refrigeration and air conditioning cycles.
C213 FLUID MECHANICS & HYDRAULIC MACHINES [Theory | Regular]	
CO ID.	Course Outcome
C213.1	Able to explain the effect of fluid properties on a flow system.
C213.2	Able to identify type of fluid flow patterns and describe continuity equation
C213.3	To analyze a variety of practical fluid flow and measuring devices and utilize fluidMechanics principles in design.
C213.4	To select and analyze an appropriate turbine with reference to given situation in power plants
C213.5	To estimate performance parameters of a given Centrifugal and Reciprocating pump.
C213.6	Able to demonstrate boundary layer concepts.
C214 INSTRUMENTATION & CONTROL SYSTEMS [Theory | Regular]	
CO ID.	Course Outcome
C214.1	To identify various elements and their purpose in typical instruments, to identify various errorsthat would occur in instruments.
C214.2	Analysis of errors so as to determine correction factors for each instrument.
C214.3	To understand static and dynamic characteristics of instrument and should be able to determineloading response time.
C214.4	For given range of displacement should be able to specify transducer, it accurate and loadingtime of that transducer.
C214.5	student will be able to understand different types of transducer
C215 Instrumentation and Control Systems Lab [Practical | Regular]	
CO ID.	Course Outcome
C215.1	An ability to apply the principles of uncertainty to data analysis from instrument measurement of a variety of properties.
C215.2	An ability to operate instruments and measurement systems to measure the properties of temperature, viscosity, pressure, flow and strain
C215.3	An ability to apply the principles of digital sampling and signal conditioning to measurement instruments.
C215.4	An ability to write reports describing experimental setups, data collection, data analysis and data presentation
C215.5	An ability to synthesize an individual automated data acquisition project, work in groups and present results to a grou
C216 Fluid Mechanics and Hydraulic Machines Lab [Practical | Regular]	
CO ID.	Course Outcome
C216.1	Able To Explain The Effect Of Fluid Properties On A Flow System
C216.2	Able To Identify Type Of Fluid Flow Patterns And Describe Continuity Equation
C216.3	To Analyze A Varity Fluid Flow And Measuring Devices And Utalize Fluid Mechanics Principle In Design

C216.4	To Select And Analyze An Appropriate Turbine With Reference To Given Situation In Power Plants.
C216.5	To Estimate Performance Parameters Of A Given Centrifugal And Reciprocating Pump
C216.6	Able To Demonstrate Boundary Layer Concepts
C217 Basic Electrical and Electronics Engineering Lab [Practical | Regular]	
CO ID.	**Course Outcome**
C217.1	To analyze and solve electrical circuits using network laws and theorems
C217.2	To understand and analyze basic Electric and Magnetic circuits
C217.3	To study the working principles of Electrical Machines
C217.4	To introduce components of Low Voltage Electrical Installations
C217.5	To identify and characterize diodes and various types of transistors
M E 3-2 (Div - A)	
C311 CAD/CAM [Theory | Regular]	
CO ID.	**Course Outcome**
C311.1	Understand geometric transformation techniques in CAD.
C311.2	Develop mathematical models to represent curves and surfaces, Model engineering components using solid modeling techniques
C311.3	Develop programs for CNC to manufacture industrial components
C311.4	To understand the application of computers in various aspects of Manufacturing
C311.5	Design, Proper planning, Manufacturing cost, Layout & Material Handling system
C312 HEAT TRANSFER [Theory | Regular]	
CO ID.	**Course Outcome**
C312.1	Understand the basic modes of heat transfer and Compute one dimensional steady state heat transfer with and without heat generation
C312.2	Understand and analyze heat transfer through extended surfaces ,Understand one dimensional transient conduction heat transfer
C312.3	understand concepts of continuity, momentum and energy equations Interpret and analyze forced convective heat transfer
C312.4	Analysis of free convection heat transfer, Design of heat exchangers using LMTD and NTU methods
C312.5	Understand the principles of boiling, condensation and radiation heat transfer
C313 UNCONVENTIONAL MACHINE PROCESSES [Theory | Regular]	
CO ID.	**Course Outcome**
C313.1	To understand importance of unconventional machining compared with conventional machining
C313.2	To learn mechanical energy based unconventional machining process (USM, WJM, AJM, AWJM)
C313.3	To learn Electrical based chemical energy based unconventional machining process (ECM, ECD)
C313.4	To learn thermal Energy based unconventional machining process (EDM, LBM,EBM)
C313.5	To Learn chemical energy based unconventional machining process (Chemical Machining)
C314 FINETE ELEMENT METHODS [Theory | Regular]	
CO ID.	**Course Outcome**
C314.1	I Introduce basic concepts of finite element methods including domain discretization, polynomialinterpolation and application of boundary conditions.
C314.2	II Understand the theoretical basics of governing equations and convergence criteria of finite element method.
C314.4	Use the commercial Finite Element packages to build Finite Element models and solve a selected range of engineering problems.
C314.5	Understand to improve or refine the approximate solution by spending more computational effort byusing higher interpolation continuities unlike expensive experimental methods/exact solutions.
C314.3	understand the 2d stress structural analysis boundary conditions, finite element analysis of axi- symmentric solids and representation of isoperimetric representation.
C315 NON-CONVENTIONAL ENERGY SOURCES [Theory | Regular]	
CO ID.	**Course Outcome**
C315.1	Identify renewable energy sources and their utilization. Understand the basic concepts of solar radiation and analyze the working of solar and thermal systems.

C315.2	Understand the concepts and applications of fuel cells, thermoelectric convertor and MHD generator.
C315.3	Identify methods of energy storage for specific applications
C315.4	Understand principles of energy conversion from alternate sources like wind
C315.5	Understand principles of energy conversion from alternate sources including, geothermal, ocean, biomass, biogas and hydrogen.
C316 DESIGN OF MACHINE MEMBERS-II [Theory | Regular]	
CO ID.	Course Outcome
C316.1	knowledge about journal bearing design using different empirical relations.
C316.2	estimation of life of rolling element bearings and their selection for given service conditions.
C316.3	able to design IC engine components and selection of suitable materials according to applications.
C316.4	Able to design mechanical components like springs,belts &pulleys
C316.5	Able to design gears according to standard ,recommended procedures which is essential in design.
C317 CAD/CAM Lab [Practical | Regular]	
CO ID.	Course Outcome
C317.1	acquaint the student with some of the terminology in this very new field and relate it to the basic engineering process of design,
C317.2	to provide an introduction to the basic analytical fundamentals that are used to create and manipulate geometric models in a computer program
C317.3	to introduce the student to full-scale CAD software systems designed for geometric modeling of engineering components and systems (attention will be directed at both drafting and full 3-D modeling systems),
C317.4	to provide experience in using the CAD tools to develop a simple project of reasonable complexity
C317.5	to provide a brief survey of methods for integrating these tools into a comprehensive design system that incorporates advanced database management concepts.
C318 Heat Transfer Lab [Practical | Regular]	
CO ID.	Course Outcome
C318.1	Perform steady state conduction experiments to estimate thermal conductivity of different materials
C318.2	Determining convective heat transfer coefficient of system
C318.3	Determining the thermal radiation heat transfer of the system
C318.4	Determining the temperature profile of fins under natural and forced convection
C318.5	Performing transient heat conduction experiments
C318.6	Performing heat exchanger experiment
C319 Advanced Communication Skills Lab [Practical | Regular]	
CO ID.	Course Outcome
C319.1	Students will have developed a better understanding of important issues related to gender in contemporary India.
C319.2	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
C319.3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
C319.4	Students will acquire insight into the gendered division of labor and its relation to politics and economics.
C319.5	Men and women students and professionals will be better equipped to work and live together as equals
C320 Environmental Science [Practical | Regular]	
CO ID.	Course Outcome
C320.1	Based on this course, the Engineering graduate will understand / evaluate / develop technologies on the basis of ecological principles,Based on this course, the Engineering graduate will understand / evaluate / develop technologies on the basis of ecological principles
C320.2	Assess/Evaluate environmental regulations which in-turn helps in sustainable development.
C320.3	Understand the need for preparation of an Environmental Impact Assessment Report before the start of any developmental project to reduce its impacts on environment and its components.
C320.4	Need for sustainable growth and development
C320.5	Conservation of faster depleting resources, prevention of extinction of biological species and degradation of ecosystems.
M E 3-2 (Div - B)	

C311 CAD/CAM [Theory | Regular]	
CO ID.	Course Outcome
C311.1	Understand geometric transformation techniques in CAD.
C311.2	Develop mathematical models to represent curves and surfaces, Model engineering components using solid modeling techniques
C311.3	Develop programs for CNC to manufacture industrial components
C311.4	To understand the application of computers in various aspects of Manufacturing
C311.5	Design, Proper planning, Manufacturing cost, Layout & Material Handling system

C312 HEAT TRANSFER [Theory | Regular]	
CO ID.	Course Outcome
C312.1	Understand the basic modes of heat transfer and Compute one dimensional steady state heat transfer with and without heat generation
C312.2	Understand and analyze heat transfer through extended surfaces ,Understand one dimensional transient conduction heat transfer
C312.3	understand concepts of continuity, momentum and energy equations Interpret and analyze forced convective heat transfer
C312.4	Analysis of free convection heat transfer, Design of heat exchangers using LMTD and NTU methods
C312.5	Understand the principles of boiling, condensation and radiation heat transfer

C313 UNCONVENTIONAL MACHINE PROCESSES [Theory | Regular]	
CO ID.	Course Outcome
C313.1	To understand importance of unconventional machining compared with conventional machining
C313.2	To learn mechanical energy based unconventional machining process (USM, WJM, AJM, AWJM)
C313.3	To learn Electrical based chemical energy based unconventional machining process (ECM, ECD)
C313.4	To learn thermal Energy based unconventional machining process (EDM, LBM,EBM)
C313.5	To Learn chemical energy based unconventional machining process (Chemical Machining)

C314 FINETE ELEMENT METHODS [Theory | Regular]	
CO ID.	Course Outcome
C314.1	I Introduce basic concepts of finite element methods including domain discretization, polynomialinterpolation and application of boundary conditions.
C314.2	II Understand the theoretical basics of governing equations and convergence criteria of finite elementmethod.
C314.4	Use the commercial Finite Element packages to build Finite Element models and solve a selectedrange of engineering problems.
C314.5	Understand to improve or refine the approximate solution by spending more computational effort byusing higher interpolation continuities unlike expensive experimental methods/exact solutions.
C314.3	understand the 2d stress structural analysis boundary conditions, finite element analysis of axi-symmentric solids and representation of isoperimetric representation.

C315 NON-CONVENTIONAL ENERGY SOURCES [Theory | Regular]	
CO ID.	Course Outcome
C315.1	Identify renewable energy sources and their utilization. Understand the basic concepts of solar radiation and analyze the working of solar and thermal systems.
C315.2	Understand the concepts and applications of fuel cells, thermoelectric convertor and MHD generator.
C315.3	Identify methods of energy storage for specific applications
C315.4	Understand principles of energy conversion from alternate sources like wind
C315.5	Understand principles of energy conversion from alternate sources including, geothermal, ocean, biomass, biogas and hydrogen.

C316 DESIGN OF MACHINE MEMBERS-II [Theory | Regular]	
CO ID.	Course Outcome
C316.1	knowledge about journal bearing design using different empirical relations.
C316.2	estimation of life of rolling element bearings and their selection for given service conditions.
C316.3	able to design IC engine components and selection of suitable materials according to applications.
C316.4	Able to design mechanical components like springs,belts &pulleys
C316.5	Able to design gears according to standard ,recommended procedures which is essential in design.

C317 CAD/CAM Lab [Practical | Regular]	
CO ID.	Course Outcome
C317.1	acquaint the student with some of the terminology in this very new field and relate it to the basic engineering process of design,
C317.2	to provide an introduction to the basic analytical fundamentals that are used to create and manipulate geometric models in a computer program
C317.3	to introduce the student to full-scale CAD software systems designed for geometric modeling of engineering components and systems (attention will be directed at both drafting and full 3-D modeling systems),
C317.4	to provide experience in using the CAD tools to develop a simple project of reasonable complexity
C317.5	to provide a brief survey of methods for integrating these tools into a comprehensive design system that incorporates advanced database management concepts.
C318 Heat Transfer Lab [Practical | Regular]	
CO ID.	Course Outcome
C318.1	Perform steady state conduction experiments to estimate thermal conductivity of different materials
C318.2	Determining convective heat transfer coefficient of system
C318.3	Determining the thermal radiation heat transfer of the system
C318.4	Determining the temperature profile of fins under natural and forced convection
C318.5	Performing transient heat conduction experiments
C318.6	Performing heat exchanger experiment
C319 Advanced Communication Skills Lab [Practical | Regular]	
CO ID.	Course Outcome
C319.1	Students will have developed a better understanding of important issues related to gender in contemporary India.
C319.2	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
C319.3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
C319.4	Students will acquire insight into the gendered division of labor and its relation to politics and economics.
C319.5	Men and women students and professionals will be better equipped to work and live together as equals
C319.6	Students will develop a sense of appreciation of women in all walks of life.
C319.7	Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.
C320 Environmental Science [Practical | Regular]	
CO ID.	Course Outcome
C320.1	Based on this course, the Engineering graduate will understand / evaluate / develop technologies on the basis of ecological principles,Based on this course, the Engineering graduate will understand / evaluate / develop technologies on the basis of ecological principles
C320.2	Assess/Evaluate environmental regulations which in-turn helps in sustainable development.
C320.3	Understand the need for preparation of an Environmental Impact Assessment Report before the start of any developmental project to reduce its impacts on environment and its components.
C320.4	Need for sustainable growth and development
C320.5	Conservation of faster depleting resources, prevention of extinction of biological species and degradation of ecosystems.
M E 4-2 (Div - A)	
C412 PRODUCTION PLANNING AND CONTROL [Theory | Elective]	
CO ID.	Course Outcome
C412.1	Evaluate MRP and JIT systems against traditional inventory control systems.
C412.2	The student will be able to, Understand production systems and their characteristics.
C412.3	Analyze aggregate planning strategies.
C412.4	Apply forecasting and scheduling techniques to production systems.
C412.5	Understand theory of constraints for effective management of production systems.
C413 UNCONVENTIONAL MACHINING PROCESSES [Theory | Elective]	
CO ID.	Course Outcome

C413.1	To understand importance of unconventional machining compared with conventional machining
C413.2	To learn mechanical energy based unconventional machining process (USM, WJM, AJM, AWJM)
C413.3	To learn Electrical based chemical energy based unconventional machining process (ECM, ECD)
C413.4	To learn thermal Energy based unconventional machining process (EDM, LBM,EBM)
C413.5	To Learn chemical energy based unconventional machining process (Chemical Machining)
C414 ENTREPRENEURSHIP AND SMALL BUSINESS ENTERPRISES [Theory | Elective]	
CO ID.	Course Outcome
C414.1	The student will know the basics of entrepreneurship and entrepreneurial development
C414.2	The student will understand the sources of business ideas and get vision for their own startup companies
C414.3	The student will identify the causes of sickness in industries and find out the remedies for them
C414.4	The student will know the importance of marketing in enterprises
C414.5	The student will explore the strategic growth in entrepreneurship
M E 4-2 (Div - B)	
C412 PRODUCTION PLANNING AND CONTROL [Theory | Elective]	
CO ID.	Course Outcome
C412.1	Evaluate MRP and JIT systems against traditional inventory control systems.
C412.2	The student will be able to, Understand production systems and their characteristics.
C412.3	Analyze aggregate planning strategies.
C412.4	Apply forecasting and scheduling techniques to production systems.
C412.5	Understand theory of constraints for effective management of production systems.
C413 UNCONVENTIONAL MACHINING PROCESSES [Theory | Elective]	
CO ID.	Course Outcome
C413.1	Understand the basic techniques of machining processes modeling
C413.2	Understand the mechanical aspects of orthogonal cutting mechanics
C413.3	Understand the thermal aspects of orthogonal cuttingmechanics
C413.4	Ability to extend, through modeling techniques, the single point, multiple point and abrasive machiningprocesses
C413.5	Estimate the material removal rate and cutting force, in an industrially useful manner, for practical machiningprocesses.
C414 ENTREPRENEURSHIP AND SMALL BUSINESS ENTERPRISES [Theory | Elective]	
CO ID.	Course Outcome
C414 .1	The student will know the basics of entrepreneurship and entrepreneurial development
C414 .2	The student will understand the sources of business ideas and get vision for their own startup companies
C414 .3	The student will identify the causes of sickness in industries and find out the remedies for them
C414 .4	The student will know the importance of marketing in enterprises
C414 .5	The student will explore the strategic growth in entrepreneurship
M E 4-2 (Div - C)	
C412 PRODUCTION PLANNING AND CONTROL [Theory | Elective]	
CO ID.	Course Outcome
C412.1	Evaluate MRP and JIT systems against traditional inventory control systems.
C412.2	The student will be able to, Understand production systems and their characteristics.
C412.3	Analyze aggregate planning strategies.
C412.4	Apply forecasting and scheduling techniques to production systems.
C412.5	Understand theory of constraints for effective management of production systems.
C413 UNCONVENTIONAL MACHINING PROCESSES [Theory | Elective]	
CO ID.	Course Outcome

C413.1	Understand the basic techniques of machining processes modeling
C413.2	Understand the mechanical aspects of orthogonal cutting mechanics
C413.3	Understand the thermal aspects of orthogonal cuttingmechanics
C413.4	Ability to extend, through modeling techniques, the single point, multiple point and abrasive machiningprocesses
C413.5	Estimate the material removal rate and cutting force, in an industrially useful manner, for practical machiningprocesses.
C414 ENTREPRENEURSHIP AND SMALL BUSINESS ENTERPRISES [Theory | Elective]	
CO ID.	Course Outcome
C414.1	The student to learn the basic of Entrepreneur and Entrepreneur
C414.2	To understand how to start a new venture, how business plans should be prepared startup central and state level, finally know about T-hub.
C414.3	To understand changes of MSMEs . Industrial sickness and Rehabilitation f sick units.
C414.4	Tp know the market situations, mix and success factors of service Marketing, Pricing , Branding and New Techniques in Marketing & Industrial Trade.
C414.5	The student to learn the strategic growth in Entrepreneurship challenges in women entrepreneurs and institutions supporting women Entrepreneurship.