K.L.N. College of Engineering
Department of Mechanical Engineering
Course Outcomes
For Anna University Curriculum Regulation 2017

Course Name:**GE8152-Engineering Graphics**	
CO	**COURSE OUTCOMES**
C106.1	Sketch the conic sections, special curves, and draw orthographic viewfrom pictorial views and models.
C106.2	Apply the principles of orthographic projections of points in all quadrants, lines and planes in first quadrant.
C106.3	Sketch the projections of simple solids like prisms, pyramids, cylinder and cone and obtain the traces of plane figures.
C106.4	Practice the sectional views of solids like cube, prisms, cylinders & cones and extend its lateral surfaces.
C106.5	Sketch the perspective projection of simple solids, truncated prisms, pyramids, cone and cylinders and sketch the isometric projection of simple machine parts.

Course Name:**GE8292-Engineering Mechanics**	
CO	**COURSE OUTCOMES**
C114.1	Analyse coplanar and non coplanar concurrent forces on particles.
C114.2	Analyse co-planar and non-coplanar non-concurrent forces on rigid bodies
C114.3	Explain the properties of surfaces and solids like moment of inertia, principal moment of inertia
C114.4	Analyse bodies at motion linear, curvilinear, relative velocity kinematically and dynamics of particles.
C114.5	Analyse frictional forces on bodies and also general plane motion of rigidbodies.
Course Name:**GE8261-Engineering Practices Laboratory**	
CO	**COURSE OUTCOMES**
CO 115.1	Apply the knowledge of pipeline connections to household fittings and industrial buildings
CO 115.2	Prepare the different joints in roofs, doors windows and furniture
CO 115.3	Perform step turning operation in a lathe
CO 115.4	Perform the various welding processes and know about it s applications
CO 115.5	Produce a funnel using sheet metal

Course Name: ME8391 Engineering Thermodynamics	
CO	**COURSE OUTCOMES**
C 202.1	Apply first law of thermodynamics for closed systems and flow process
C 202.2	Apply second law of thermodynamics to open and closed systems and calculate entropy and availability.
C202.3	Calculate efficiency of simple and improved Rankine cycle
C202.4	Derive simple thermodynamic relations of ideal gases
C202.5	Calculate properties of gas mixtures and moist air using thermodynamic relations and psychrometric chart
Course Name: ME8394Fluid Mechanics and Machinery	
CO	**COURSE OUTCOMES**
C 203.1	Calculate fluid properties and characteristics of flow using mathematical knowledge.
C 203.2	Compute loses in circular conduits using conservation laws.
C203.3	Perform dimensional analysis of a given set of variables using Buckingham's π theorem and relate the model and prototype.
C203.4	Analyze the performance of pumps.
C203.5	Analyze the performance of hydraulic machines.
Course Name: ME8351 Manufacturing Technology - I	
CO	**COURSE OUTCOMES**
C 204.1	Explain the process of making patterns, preparation of sand mould, various special casting processes and casting defects.
C 204.2	Describe various fusion, friction and special welding processes, soldering and brazing processes.
C204.3	Employ the appropriate metal forming techniques to produce components like hexagonal bolt, nut etc.,
C204.4	Illustrate the various sheet metal forming processes for a specific application.
C204.5	Describe the properties and bonding techniques of plastics and various plastic molding techniques.
Course Name: ME8391 Manufacturing Technology Laboratory - I	
CO	**COURSE OUTCOMES**
C 206.1	Perform the taper turning operation for a given specification.
C 206.2	Perform thread cutting operation as per the diagrams and compare with standard thread gauges.
C206.3	Calculate the eccentricity value for the required stroke length and practice eccentricity turning operation in lathe.

C206.4	Produce square head using shaper machine as per given drawing and estimate the machining time.
C206.5	Calculate the material removal rate and perform Hexagonal head shaping on a given cylindrical work piece as per given drawing.

Course Name:**ME8391 – Computer Aided Machine Drawing**	
CO	**COURSE OUTCOMES**
C 207.1	Understand and interpret drawings of machine components like screw jack, machine vice, tail stock, chuck, vane and gear pump etc.
C 207.2	Create the assembly of 2D drawings both manually and using standard CAD packages
C 207.3	Create the assembly 3D drawings both manually and using standard CAD packages
C 207.4	Re-create part drawings, sectional views and assembly drawings as per standards, Editing, Dimensioning, Layering, Hatching, Block, Array, Detailing, Detailed
C 207.5	Understand the drawing standards, Fits and Tolerances

Course Name: ME8492 Kinematics of Machinery	
CO	**COURSE OUTCOMES**
C 211.1	Discuss the basics of mechanism which will have defined required motion.
C 211.2	Calculate velocity and acceleration is simple mechanisms using graphical approach, instantaneous center method and synthesis the mat elementary level.
C 211.3	Develop CAM profiles for the required predefined motion of follower.
C 211.4	Solve problems on gears and determine the speeds of simple, compound and epicyclical gear trains.
C 211.5	Examine friction in machine elements like screw threads, clutches, belts, ropes and band and block brakes.

Course Name: C212 (ME8451 – Manufacturing Technology – II)	
CO	**COURSE OUTCOMES**
C 212.1	Explain the mechanics of metal cutting, cutting tool materials, tool wear and cutting fluids.
C 212.2	Discuss about the constructional feature of different types of lathe and their operations.
C212.3	Describe the construction & working of shaping, milling & drilling machines and gear cutting & finishing process.
C212.4	Illustrate the various types of grinding machines and broaching machines.
C212.5	Explain the construction feature of different types of CNC machine and manual part programming for a given component.

Course Name: C213 (ME8491 – Engineering Metallurgy)	
CO	**COURSE OUTCOMES**

CO	COURSE OUTCOMES
C 213.1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification
C 213.2	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.
C213.3	Describe the effect of alloying elements on ferrous and non-ferrous metals
C213.4	Summarize the properties and applications of non metallic materials
C213.5	Explain the testing of mechanical properties

Course Name: C214 (Strength of Materials for Mechanical Engineers)	
CO	**COURSE OUTCOMES**
C 214.1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes.
C 214.2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.
C214.3	Apply basic equation of simple torsion in designing of shafts and helical spring
C214.4	Calculate the slope and deflection in beams using different methods
C214.5	Analyze and design thin and thick shells for the applied internal and external pressures.

Course Name: C215 (ME8493 - Thermal Engineering I)	
CO	**COURSE OUTCOMES**
C 215.1	Calculate efficiency of gas power cycles and vapour power cycles
C 215.2	Calculate efficiency of reciprocating air compressor
C215.3	Explain the working principle of SI and CI engines and combustion phenomenon
C215.4	Calculate performance of IC engines and explain the functioning of auxiliaries of IC engines
C215.5	Calculate the performance of gas turbines

Course Name: C216 (Manufacturing Technology Laboratory - II)	
CO	**COURSE OUTCOMES**
C 216.1	Demonstrate contour milling and generate a spur gear from a cylindrical work piece.
C 216.2	Perform helical gear cutting operation and generate gear using hobbing machine.
C216.3	Generate gear using gear shaping machine and demonstrate plain surface grinding operation.
C216.4	Perform cylindrical grinding operation and practice Tool angle grinding with tool and Cutter Grinder.
C216.5	Measure cutting forces in Milling / Turning Process and develop CNC part programming.

Course Name: C217 (CE8381 – Strength of materials and Fluid mechanics and Machinery Lab)

CO	COURSE OUTCOMES
C 217.1	Perform tension, torsion, hardness, compression and deformation test on solid materials
C 217.2	Analyze the microstructure and characteristics of specimen
C 217.3	Calculate the coefficient of discharge for orifice meter and venturimeter
C 217.4	Calibrate the rotameter and estimate the friction factor for flow through pipes
C 217.5	Predict performance characteristics centrifugal pump, submergible pump, reciprocating pump, gear pump and turbines

Course Name: C301 (ME8595 Thermal Engineering - II)

CO	COURSE OUTCOMES
C 301.1	Calculate the velocity of steam through steam nozzles.
C 301.2	Explain the functioning and features of different types of Boilers and auxiliaries and calculate performance parameters.
C 301.3	Sketch velocity diagrams for steam turbines.
C 301.4	Describe the concept of Cogeneration, Working features of Heat pumps and Heat exchangers
C 301.5	Calculate properties of moist air and COP of vapour refrigeration systems by using refrigeration table and chart.

Course Name: C302 (Design of Machine Elements)

CO	COURSE OUTCOMES
C 302.1	Apply the principle of solid mechanics to design machine member under variable loading.
C 302.2	Calculate the diameter of shafts based on strength, rigidity and design various types of coupling based on application.
C 302.3	Calculate design parameters of permanent and temporary joint on various loading application.
C 302.4	Calculate the design parameter for energy storage element and engine components
C 302.5	Calculate the design parameters of various types of bearings.

Course Name: C303 (Metrology and Measurements)

CO	COURSE OUTCOMES
C 303.1	Discuss the measurement systems, errors in measurements,precision and accuracy
C 303.2	Explain the various linear and angular measurement systems and understand the concept of interchangeability
C 303.3	Describe the working principle of CMM, Machine Vision Systemand list the applications of them.
C 303.4	Explain the various form measurements like thread, gear, roundness and surface finish.
C 303.5	Discuss the working of miscellaneous measuring equipments for measuring temperature, flow andpower.

	Course Name: C304 (ME8594 Dynamics of Machines)	
CO	**COURSE OUTCOMES**	
C 304.1	Explain the force-motion relationship in components subjected to external forces and analysis of standard mechanisms.	
C 304.2	Explain the undesirable effects of unbalances resulting from prescribed motions in mechanism.	
C304.3	Calculate the natural frequencies for undamped and damped vibrating systems.	
C304.4	Solve problem on effect of Dynamics of undesirable vibrations.	
C 304.5	Explain the principles in mechanisms used for speed control and stability control.	

	Course Name: C306 (ME8511–Kinematics and Dynamics Laboratory)	
CO	**COURSE OUTCOMES**	
C306.1	Describe various types of gears, gear trains, kinematic mechanisms, and universal joints.	
C306.2	Estimate the mass moment of inertia of axisymmetric objects using Turn table apparatus, bi-filar suspension, compound pendulum and natural frequency for	
C306.3	Inspect the critical speed of shaft under the given load conditions and the gyroscopic effect and couple on motorized gyroscope.	
C306.4	Sketch the characteristic curves of Watt, Porter, Proell and Hartnell governors and motion curves for the given cam follower setup.	
C306.5	Examine the balancing of rotating masses in dynamic balancing machine.	

	Course Name: C307 (ME8512–Thermal Engineering Laboratory)	
CO	**COURSE OUTCOMES**	
C307.1	Conduct tests on heat conduction apparatus and evaluate thermal conductivity of materials	
C307.2	Conduct tests on natural and forced convective heat transfer apparatus and evaluate heat transfer coefficient	
C307.3	Conduct test on radiative heat transfer apparatus and evaluate Stefan Boltzmann constant and emissivity.	
C307.4	Conduct tests to evaluate the performance of parallel/counter flow heat exchanger apparatus and reciprocating air compressor.	
C307.5	Conduct tests to evaluate the performance of refrigeration and air-conditioning test rigs.	

	Course Name: C308 (ME8513– Metrology and Measurements Laboratory)	
CO	**COURSE OUTCOMES**	
C308.1	Inspect the dimensions and the dimensional deviations of given parts.	
C 308.2	Inspect the dimensions, angularity and parallelism of a given component.	
C308.3	Model the torque characteristic curves to various loads at various distances.	

C 308.4	Inspect the straightness of surfaces and size of irregularities on a machined surface.
C 308.5	Measure the vertical distances or height of objects, taper angle of slope for a given component, various parameters of threads and gear wheel.

Course Name: C309 (Design of Transmission Systems)	
CO	**COURSE OUTCOMES**
C309.1	Design belt drives (flat belt, V-belt), chain drives, rope drives, belt drive pulleys & chain sprockets.
C 309.2	Design spur and straight helical gears based on strength and wear consideration.
C309.3	Design straight bevel gear, worm gear pair and cross helical gear.
C 309.4	Design various gear boxes (sliding mesh, constant mesh, multispeed) through geometric progression, standard step ratio, ray diagram, kinematics layout.
C 309.5	Design various cams, clutches, internal and external shoe brakes using basic knowledge acquired from earlier studies.

Course Name: C310 (Computer Aided Design and Manufacturing)	
CO	**COURSE OUTCOMES**
C 310.1	Describe the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics.
C 310.2	Explain the various types of parametric curves, surfaces and solids
C 310.3	Describe the different types of standard systems used in CAD
C 310.4	Develop part program for Lathe & Milling machines
C 310.5	Compare the different types of techniques used in Cellular Manufacturing and FMS

Course Name: C311 (ME8693 – HEAT AND MASS TRANSFER)	
CO	**COURSE OUTCOMES**
C 311.1	Analyze steady & unsteady heat transfer in composite systems with & without heat generation and extended surfaces.
C 311.2	Calculate free and force convection heat transfer in external and internal flows.
C311.3	Describe film wise & drop wise condensation, pool & flow boiling and analyze heat exchanger using LMTD and NTU approaches.
C311.4	Analyze radiation heat transfer between surfaces using shape factor algebra.
C311.5	Analyze diffusion and convective mass transfer occurring in different applications.

Course Name: C312 (ME6603-Finite Element Analysis)	
CO	**COURSE OUTCOMES**
C312.1	Explain the steps involved in FEA and also the types of weight residual methods.
C 312.2	Formulate FE equation for structural, heat transfer and vibration problems.

CO	COURSE OUTCOMES
C 312.3	Predict finite element equations for two dimensional thermal and torsion problems.
C 312.4	Predict finite element equations for axisymmetric bodies, plate and shell.
C 312.5	Apply matrix solution techniques to dynamic problems.

Course Name: C313 (ME8694-Hydraulics and Pneumatics)	
CO	**COURSE OUTCOMES**
C313.1	Explain the fluid power and operation of different types of pumps
C 313.2	Summarize the features and functions of Hydraulic motors, actuators and flow control valves
C 313.3	Explain the different types of Hydraulic circuits and systems
C 313.4	Explain the working of different pneumatic circuits and systems
C 313.5	Summarize the various trouble shooting methods and applications of hydraulic and pneumatic systems

Course Name: C315 (ME8681 - CAD / CAM Laboratory)	
CO	**COURSE OUTCOMES**
C315.1	Create 3D models using modeling software
C 315.2	Understand the CNC control in modern manufacturing system
C 315.3	Prepare CNC part programming and perform manufacturing
C 315.4	Create the CL Data and Post process generation using CAM packages
C 315.5	Apply CAPP in Machining and Turning Centre

Course Name: C401 (ME8792 – Power Plant Engineering)	
CO	**COURSE OUTCOMES**
C401.1	Explain the layout, construction and working of the components inside a thermal power plant
C401.2	Explain the layout, construction and working of the components inside a Diesel, Gas and combined cycle power plants.
C401.3	Explain the layout, construction and working of the components inside nuclear power plants.
C401.4	Explain the layout, construction and working of the components inside Renewable energy power plants.
C401.5	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.

Course Name: C403 (ME8791 – Mechatronics)	
CO	**COURSE OUTCOMES**

CO	COURSE OUTCOMES
C403.1	Discuss the interdisciplinary applications of electronics, electrical, mechanical and computer systems for the control of mechanical, electronic systems and
C403.2	Discuss the architecture of microprocessor and microcontroller, Pin Diagram, addressing modes of microprocessor and microcontroller
C403.3	Discuss Programmable Peripheral Interface, Architecture of 8255 PPI, and various device interfacing
C403.4	Explain the architecture, programming and application of programmable logic controllers to problems and challenges in the areas of Mechatronic engineering
C403.5	Discuss various actuators and mechatronics system using the knowledge and skills acquired through the course and also from the given case studies.

Course Name: C402 (ME8793 – Process Planning and Cost Estimation)	
CO	**COURSE OUTCOMES**
C402.1	Select the process, equipment and tools for various industrial products
C402.2	Prepare process planning activity chart
C402.3	Explain the concept of cost estimation
C402.4	Compute the job order cost for different type of shop floor
C402.5	Calculate the machining time for various machining operation

Course Name: C407 (Simulation and Analysis Laboratory)	
CO	**COURSE OUTCOMES**
C 407.1	Simulate the working principle of air conditioning system, hydraulic and pneumatic cylinder and cam follower mechanisms using MATLAB.
C 407.2	Analyze the stresses and strains induced in plates, brackets and beams and heat transfer problems.
C407.3	Calculate the natural frequency and mode shape analysis of 2D components and beams.
C407.4	Analyze the temperature distribution in one dimensional heat transfer problems (walls and fins).
C407.5	Analyze the temperature distribution in two dimensional heat transfer problems (plates and shell).

Course Name: C408 (Mechatronics Laboratory)	
CO	**COURSE OUTCOMES**
C 408.1	Create the program for arithmetic functions and the program for sorting, code conversion functions.
C 408.2	Formulate the program codes to interface with traffic light controller and stepper motor.
C408.3	Compare the set speed with actual speed of DC motor by interfacing suitable speed sensors
C408.4	Integrate all the hydraulic, pneumatic and electro pneumatic circuits by using simulation software.

C408.5	Analyze the real images and template images based on image processing techniques

Course Name: C410 (MG8591 – Principles of Management)

CO	COURSE OUTCOMES
C 410.1	Explain the purpose of management, roles and skills of Manager in local and global organization.
C 410.2	Describe the purpose of planning, decision making and their processes.
C 410.3	Demonstrate the various organizational structures and staff selection procedure.
C 410.4	Classify the motivational theories and communication process.
C 410.5	Describe the scope of control and role of computer, IT in management control.

Course Name: C314-E1 (ME8091 Automobile Engineering)

CO	COURSE OUTCOMES
C 314-E1.1	Explain the various types of chassis, frame and functions of IC engine parts.
C 314-E1.2	Describe the engine auxiliary system and engine emission control
C 314-E1.3	Describe the working of different types of transmission systems.
C 314-E1.4	Explain the functioning of steering, brakes and the suspension systems.
C 314-E1.5	Describe various alternate sources of energy for IC engines

Course Name: C314-E2 (PR8592 Welding Technology)

CO	COURSE OUTCOMES
C 314-E2.1	Compare various types of gas and arc welding processes
C 314-E2.2	Explain the working principles of resistance welding process and various process parameters influence on their performance
C 314-E2.3	Illustrate the working of various types of solid state welding processes
C 314-E2.4	Choose the suitable welding process for aerospace, nuclear and automobile industries
C 314-E2.5	Compare different types of welding process for effective welding of aluminium, copper and stainless steels

Course Name: C314 E3 (ME8096 – GAS DYNAMICS AND JET PROPULSION)

CO	COURSE OUTCOMES
C 314.1	Discuss the basic difference between incompressible flow and compressible flow and the effect of Mach number on compressible flow.
C 314.2	Compare Fanno flow and Rayleigh flow and calculate the flow properties in Fanno flow and Rayleigh flow.

C314.3	Compute the Prandtl Meyer equation for shock waves.
C314.4	Compare the working of various jet engines and calculate thrust & efficiency in jet propulsion using gas dynamics principles.
C314.5	Classify rocket engines and calculate efficiency in rocket propulsion.

Course Name: C 314-E4 (GE8075 Intellectual Property Rights)	
CO	**COURSE OUTCOMES**
C 314-E4.1	Explain the basic principles and sources of international intellectual property and human rights.
C 314-E4.2	Analyze the interaction between national and international registration, patents and designs.
C 314-E4.3	Explain copyright, trademark, designs and information technology act.
C 314-E4.4	Analyze complicated international legal issues and intellectual property issues from a human right perspective and digital innovations
C 314-E4.5	Discuss in a qualified manner, of intellectual property issues from a human right perspective.

Course Name: C 314-E5 (Fundamentals of Nano Science)	
CO	**COURSE OUTCOMES**
C 314-E5.1	To explain the implications of Physics, Chemistry, Biology and Engineering in Nnao Science and Technology
C 314-E5.2	To explain the various synthesis and preparation methods of Nanoparticles
C 314-E5.3	To explain the various properties of Nanomaterials
C 314-E5.4	To explain the various characterization techniques
C 314-E5.5	To explain the various applications of Nanomaterials

Course Name: C 405-E1 (ME8071 – Refrigeration and Air Conditioning)	
CO	**COURSE OUTCOMES**
C 405-E1.1	Explain the basic concepts of Refrigeration
C 405-E1.2	Explain the Vapor compression Refrigeration systems and to solve problems
C 405-E1.3	Discuss the various types of Refrigeration systems
C 405-E1.4	Calculate the Psychrometric properties and its use in psychrometric processes
C 405-E1.5	Explain the concepts of Air conditioning and to solve problems

Course Name: C405-E2 (Renewable Sources of Energy)	
CO	**COURSE OUTCOMES**

C 405-E2.1	Discuss the importance and Economics of renewable Energy
C 405-E2.2	Discuss the method of power generation from Solar Energy
C 405-E2.3	Discuss the method of power generation from Wind Energy
C 405-E2.4	Explain the method of power generation from Bio Energy
C 405-E2.5	Explain the Tidal energy, Wave Energy, OTEC, Hydro energy, Geothermal Energy, Fuel Cells and Hybrid Systems.

Course Name: C405-E3 (Quality Control and Reliability Engineering)

CO	COURSE OUTCOMES
C 405-E3.1	Summarize the concept of Quality and Process control for variables
C 405-E3.2	Apply the process control for attributes
C 405-E3.3	Explain the concept of sampling and to solve problems
C 405-E3.4	Explain the concept of Life testing
C 405-E3.5	Explain the concept Reliability and techniques involved

Course Name: C405-E4 (ME8073 – Unconventional Machining Process)

CO	COURSE OUTCOMES
C 405-E4.1	Explain the need for unconventional machining processes and its classification
C 405-E4.2	Compare various thermal energy and electrical energy based unconventional machining processes
C 405-E4.3	Summarize various chemical and electro-chemical energy based unconventional machining processes
C 405-E4.4	Explain various nano abrasives based unconventional machining processes
C 405-E4.5	Distinguish various recent trends based unconventional machining processes

Course Name: C 405.E5 (MG8491 – OPERATIONS RESEARCH)

CO	COURSE OUTCOMES
C 405.E5.1	Solve the maximization and minimization problems by using simplex linear programing method for the objective function with constraints
C 405.E5.2	Model the transportation and project network problems to find the shortest route and critical path
C405.E5.3	Apply the inventory models for inventory control modes in practice

C405.E5.4	Develop the queuing models for single and multi-server modes
C405.E5.5	Develop the decision and replacement models by using dynamic and multi variable search technique to solve the simple problems

Course Name: C405.E6 (MF8071 - Additive Manufacturing)	
CO	**COURSE OUTCOMES**
C 405E6.1	Explain the needs of additive manufacturing technology techniques.
C 405E6.2	Explain the concept of data processing for additive manufacturing technology
C 405E6.3	Differentiate between liquid based and solid based additive manufacturing systems
C 405E6.4	Illustrate the process of three dimensional printing
C 405E6.5	Discuss bio-additive manufacturing, computer aided tissue engineering

Course Name: C405.E7 (GE8077 – Total Quality Management)	
CO	**COURSE OUTCOMES**
C 405E7.1	Explain the importance of quality and deming philosophy of quality
C 405E7.2	Describe the method of continuous process improvement
C 405E7.3	Apply traditional & modern quality management tools and techniques to manufacturing and service processes
C 405E7.4	Apply statistical tools & techniques to different processes
C 405E7.5	Assess the implementation of ISO 9000/9001-2008/14000 for given manufacturing, service sector.

Course Name: C406-E1 (ME8099 – Robotics)	
CO	**COURSE OUTCOMES**
C 406-E1.1	Explain the concepts of industrial robots, classification, specifications and coordinate systems. Also summarize the need and application of robots in different sectors
C 406-E1.2	Illustrate the different types of robot drive systems as well as robot end effectors.
C 406-E1.3	Apply the different sensors and image processing techniques in robotics to improve the ability of robots.
C 406-E1.4	Develop robotic programs for different tasks and familiarize with the kinematics motions of robot.
C 406-E1.5	Examine the implementation of robots in various industrial sectors and interpolate the economic analysis of robots.

Course Name: C406-E2(ME 8095 Design of Jigs, Fixtures and Press Tools)

CO	COURSE OUTCOMES
C 406E2.1	Summarize the principles of locating and clamping devices in machining process.
C 406E2.2	Design jigs and fixtures for a given component.
C 406E2.3	Design an appropriate type of press tool for a given component.
C 406E2.4	Develop a drawing die for a given component.
C 406E2.5	Use computer aids for sheet metal forming analysis

Course Name: C 406-E3 (ME8093 Computational Fluid Dynamics)

CO	COURSE OUTCOMES
C 406-E3.1	Derive the governing equations and boundary conditions for Fluid dynamics
C 406-E3.2	Analyze Finite difference and Finite volume methods for Diffusion.
C 406-E3.3	Analyze Finite volume method for Convection - diffusion
C 406-E3.4	Analyze Flow field problems using SIMPLE and PISO algorithms.
C 406-E3.5	Explain different Turbulence models.

Course Name: C 406-E4 (ME8097 Non Destructive Testing and Evaluation)

CO	COURSE OUTCOMES
C 406-E4.1	Explain the fundamental concepts of NDT
C 406-E4.2	Discuss the different methods of NDE
C 406-E4.3	Explain the concept of Thermography and Eddy current testing
C 406-E4.4	Explain the concept of Ultrasonic Testing and Acoustic Emission
C 406-E4.5	Explain the concept of Radiography

Course Name: C 406-E5 (Composite Materials and Mechanics)

CO	COURSE OUTCOMES
C 406-E5.1	To summarize the various types of fibers, equations and manufacturing methods for composite materials
C 406-E5.2	To derive flat plate laminate equations
C 406-E5.3	To analyze lamina strength
C 406-E5.4	To analyze the thermal behavior of composite laminates
C 406-E5.5	To analyze laminate flat plates

Course Name: C 406-E6 (Foundation Skills in Integrated Product Development)	
CO	COURSE OUTCOMES
C 406-E6.1	To define, formulate and analyze a problem
C 406-E6.2	To solve specific problems independently or as part of a team
C 406-E6.3	To gain knowledge of the innovation & product development process in the business context
C 406-E6.4	To work independently as well as in teams
C 406-E6.5	To manage a project from start to finish

Course Name: C 406-E7 (Human Rights)	
CO	COURSE OUTCOMES
C 406-E7.1	Explain the various aspects of human rights.
C 406-E7.2	Explain the concept of Human Rights Magana carta and Geneva convention
C 406-E7.3	Describe the theories and perspectives of UN Laws and UN Agencies
C 406-E7.4	Describe the Human Rights and Constitutional Provisions / Guarantees in India
C 406-E7.5	Interpret the implementation of Human rights and role's of NGO.

Course Name: C406-E8 (GE8071 Disaster Management)	
CO	COURSE OUTCOMES
C406-E8.1	Explain'Disaster' and its various types and its impact on society in different kinds.
C406-E8.2	Describe the relationship between vulnerability, disasters, disaster prevention and risk reduction
C406-E8.3	Explain vulnerability of disasters on infrastructure developments like dams and climate changes focus on India.
C406-E8.4	Describe Components of disaster management like mitigation, response, preparedness, risk assessment, recovery and assessment
C406-E8.5	Explore case studies in nearby prone areas and planning for mitigation and management.

Course Name: C411-E1 (IE8693 - Production Planning and Control)	
CO	COURSE OUTCOMES
C 411-E1.1	Describe the functions of production control, various production system, different aspects of product development and break even analysis.

C 411-E1.2	Describe the concept of Method study, Motion study and work measurement techniques.
C 411-E1.3	Perform the analysis of problems in lack of product planning, quantity determination in batch production and analysis of process capabilities in a multi-
C 411-E1.4	Discuss about production scheduling, production control systems, progress reporting & expediting and techniques for aligning completion times & due
C 411-E1.5	Calculate the economic order quantity & economic lot size in inventory control.

Course Name: C 411-E2 (MG8091 - Entrepreneurship Development)	
CO	**COURSE OUTCOMES**
C 411-E2.1	Differentiate between Entrepreneur and Intrapreneur and appraise the importance of entrepreneurship in economic growth.
C 411-E2.2	Explain the need, objectives of Entrepreneurship Development Programs.
C 411-E2.3	Appraise the steps involved in setting up a business and business project reports.
C 411-E2.4	Explain the need of financing and accounting.
C 411-E2.5	Examine the government policy and assistance for the entrepreneur.

CourseName: C411 –E3 (ME8094 Computer Integrated Manufacturing Systems)	
CO	**COURSE OUTCOMES**
C 411 E3.1	Describe the elements of CIM system & an automated system, Production system and mathematical models of production performance & manufacturing
C 411 E3.2	Discuss the use of computers in process planning, different aspects of planning system and control systems.
C 411 E3.3	Solve the simple problems in part coding system in Group Technology and quantitative analysis in cellular manufacturing.
C 411 E3.4	Discuss the flexible manufacturing system components, planning & control and Automated Guided Vehicle System.
C 411 E3.5	Discuss the Robot anatomy, related attributes, and classification of robots, robot control systems and robot part programming.

Course Name: **C411-E4 (ME8074 Vibration and Noise Control)**	
CO	**COURSE OUTCOMES**
C411-E4.1	Describe the fundamental concepts of engineering noise and vibration, measurement techniques to find natural frequency.
C411-E4.2	Discuss the various terminology involved in production of noise, measurement and analysis of noise.
C411-E4.3	Describe sources and measurement standard of noise in automobiles
C411-E4.4	Explain the fundamental mechanisms of vibration isolation, apply different solutions and calculate design parameters.

C411-E4.5	Discuss about the sources of vibration and control methods.

Course Name: **C411-E5 (Micro Electro Mechanical Systems)**	
CO	**COURSE OUTCOMES**
C411-E5.1	To provide knowledge of semiconductors and solid mechanics to fabricate MEMS devices
C411-E5.2	To describe the rudiments of Micro fabrication techniques
C411-E5.3	To introduce various sensors and actuators
C411-E5.4	To introduce different materials used for MEMS
C411-E5.5	To describe the applications of MEMS to disciplines beyond Electrical and Mechanical Engineering

Course Name: **C411-E6 (GE8076 – Professional Ethics in Engineering)**	
CO	**COURSE OUTCOMES**
C411-E6.1	Distinguish between Moral and Ethics
C411-E6.2	Summarize the moral Theories and ethical inquiries
C411-E6.3	Evaluate the result of the engineering projects by applying ethical theories
C411-E6.4	Discuss about professional rights, employ rights and intellectual property rights, safety and risk involved in engineering projects
C411-E6.5	Judge the role of engineer in environmental issues, computer applications, weapons development, multinational corporations and corporate social responsibility

Course Name: C316 (ME8682Design and Fabrication Project)	
C 316.1	**Develop conceptual and engineering design of any mechanical components and also to fabricate them using different manufacturing tools and tecniques.**

Course Name: C409 (Technical Seminar)	
C 409	To demonstrate the communication and engineering skills

Course Name: C412 (Project work)	
C 412	To demonstrate the engineering knowledge and solving practical problems