MAR ATHANASIUS COLLEGE OF ENGINEERING
KOTHAMANGALAM

MECHANICAL ENGINEERING DEPARTMENT

LIST OF COURSE OUTCOME

B.TECH 2015 SCHEME

Semester	Course Code	Course Name	CO No	CO Description
S1	MA101	Calculus	1	Ability to check the convergence of infinite series.
			2	Ability to find maxima and minima of functions two variables.
			3	Ability to Apply calculus of vector valued functions in physical applications.
			4	Ability to Find area and volume using multiple integrals.
			5	Ability To apply different differential operators to various vector valued functions .
			6	Ability To evaluate different integrals using Green's, Divergence, Stokes' theorem.
S1	PH100	Engineering Physics	1	To learn the fundamentals of the theory of oscillations and waves and their applications in various branches of science and engineering
			2	To introduce the students to the theory of interference and diffraction and their applications to various branches of science and engineering
			3	To study the theory and applications of polarization and superconductivity
			4	To provide a basic introduction to the methods of Statistical Physics and Quantum Mechanics and their applications
			5	To impart knowledge about the production and uses of Ultrasonic waves; To introduce concepts of architectural. acoustics that are relevant to Civil Engineering
			6	To introduce the theory and applications of LASER, fibre optics, fibre optic sensors and optical detectors
S1	BE 103	Introduction To Sustainable Engineering	1	Able to appreciate and explain the different types of environmental pollution problems and their sustainable solutions
			2	Able to apply the concepts of sustainability in their respective area of specialization
			3	To know the tools for sustainability, Life cycle assessment and procedure for LCA

			4	To know about the basic concepts of sustainable habitat, Green buildings, green materials
			5	To know the global environmental issues, Resource degradation, Desertification, wetland reclamation, Climate change, Ozone layer depletion and Carbon credits
			6	To the basic concepts about Conventional and non-conventional, solar energy, solar thermal systems, solar photo voltaic systems and Fuel cell
S1	BE 101-02	Introduction to Mechanical Engineering	1	Learn the basic concepts of Thermodynamics, its terminologies and the major Power generation methods
			2	Learn the working principles of various Turbo machines, Internal Combustion Engines and principle of Rocket propulsion.
			3	Learn the principles of Refrigeration and Air Conditioning systems and the industrial and house hold applications.
			4	Learn the basic concepts of Automobile and Aeronautical Engineering.
			5	Learn the basic type of Mechanisms used in machineries, the design considerations, codes and standards.
			6	Identify different Engineering Materials, properties, material testing and methods of manufacturing. To impart an idea about different organisations for manufacturing.
S1	BE110	Engineering Graphics	1	Able to visualize the appearance of objects before actually forming them.
			2	Familiar with international standards of engineering drawing.
			3	Familiar with modern drawing tools / software used for engineering drawing.
			4	Familiar with perspective and isometric projections of any objects.
			5	Familiar with surface shape required for the formation of any objects.
			6	Familiar with intersection curves formed due to intersection of objects.
S1	CE100	Basic Civil Engineering	1	Students will be able to get an idea about fundamental aspects of civil engineering
			2	Students will be able to plan and set out a building
			3	Students will be able to get an idea about surveying
			4	Students will be able to get an idea about uses of various building materials
			5	Students will be able to get an idea about various methods of construction

			6	Students will be able to get an idea about various services in a building
S1	CE110	Basic Civil Workshop	1	The students should be able to take horizontal and vertical measurements and do computation using intruments
			2	The students should be able to compute area and volume of various features of building
			3	The students should be able to set out a building as per plan
			4	The students should be able to understand different construction practises in brick masonry
			5	The students should be able to find the level difference between two points
S1	PH110	Engineering physics Lab(PH110)	1	Ability to measure signal parameters using a CRO
			2	Familiarity with diffraction patterns
			3	Insight into various features of a Newton's Rings system
			4	Familiarity with polarizers and analyzers
			5	Familiarity with the working of a polarimeter
			6	Ability to utilize and insight into the working of photovoltaic and thermal detectors
S1	ME110	Mechanical Engineering Workshop	1	Acquiring knowledge in various tools and components like bearing, seals , Circlips , O rings, Allen keys etc
			2	Hand on experience in carpentry, fitting, smithy, foundry, welding and sheet metal
			3	Familirisation of Lathe, milling machine, drilling machine, shaper, slotter and grinding machine
			4	MIG welding, TIG welding and Rototech welding
			5	
			6	
S2	MA102	Differential Equations(MA102)	1	To learn basic concepts of homogenous linear ODEs and to develop skills in modeling and analyzing engineering problems using Differential equations
			2	To impart skills in solving non homogenous ODEs
			3	To develop knowledge in Fourier series and related results.
			4	To impart knowledge in solving engineering problems involving 2 or more variables .
			5	To develop skills in solving 1D wave equations
			6	To develop skills in solving 1D wave equations under the initial and Boundary conditions.

S2	BE 102	Design and Engineering	1	Able to appreciate the different elements involved in good designs and to apply them in practice when called for.
			2	Aware of the product oriented and user oriented aspects that make the design a success.
			3	Will be capable to think of innovative designs incorporating different segments of knowledge gained in the course;
			4	Students will have a broader perspective of design covering function, cost, environmental sensitivity, safety and other factors other than engineering analysis.
S2	CY 100	Engineering Chemistry	1	Understand the basic concepts of spectroscopy which will be useful in the analysis of new materials for Engineering applications.
			2	Understand the basic concepts of Electrochemistry to explore the possibilities of Electrochemical machining and applications of batteries.
			3	Learn about the various thermal analysis methods which will be useful in understanding the behaviour of Engineering materials at various temperatures. Also learn the principles of chromatographic methods.
			4	Learn about polymers and nanomaterials and understand the principles,applications and limitations of these cutting-edge materials in various designs.
			5	Gain knowledge about the properties of fuels and lubricants to develop new fuels and lubricants to increase the efficiency of automobiles.
			6	Study various types of water-treatment methods including sewage to develop skill for treating industrial wastewater.
S2	BE 100	Engineering Mechanics	1	To apply fundamental principles of mechanics & principles of equilibrium to simple and practical problems of engineering.
			2	To apply principles of statics to determine reactions & internal forces in statically determinate beams.
			3	Determine centroid and moment of inertia of different geometrical shapes and be able to understand its importance.
			4	Know the basics of friction and virtual work as well as its importance through simple applications.
			5	Knowledge of kinematic and kinetic analyses and energy and momentum methods for particles.
			6	Apply fundamental concepts of kinematics and kinetics for analysis of simple, practical rigid body problems.
S2			1	An ability to analyze electric circuits (resistive)

	EE 100	Basics of Electrical Engineering	2	Have a basic knowledge about electric and magnetic circuits and their interaction
			3	Understand AC circuits(both single phase and three phase) and solve any RLC circuit and power measurement in a circuit.
			4	Familiarized with conventional and non conventional sources, their importance and different generation systems and power transmission scheme.
			5	Insight about the principle of operation, construction types and applications of transformers and DC machines
			6	Gain the knowledge about the principle of operation, construction types and applications of transformers and DC machines.
S2	EC 100	Basics of Electronics Engineering	1	Students will be able to identify active and passive components and their specifications
			2	Students will be able to understand different types of diodes and transistors
			3	Student will be able to design simple rectifier cicuits and will get an idea about amplifiers and oscillators.
			4	Students will be able to design simple amplifier circuits using OP amp and will get the basic concepts DSO,function generator and multimeter
			5	Student can understand the basic principles of radio communication
			6	Student can understand the mobile and optical communication. Also will be able to get basic idea about TV, CCTV and DTH
S2	CY 110	Engineering Chemistry Lab	1	Learn estimation of hardness by complexometric titration and understand the working of pH meter
			2	Understand the basic principles of spectroscopy and use of calorimeter in the estimation of unkm=nown concentration and in the determination of molar absorptivity
			3	Learn titrstion using pottentiometer for the estimation of Fe(2+) in Mohr's salt solution
			4	Understand the estimation of Cl(-) ions in the given sample of water
			5	understand the working of conductivity meter and the determination of conductivity of unknown solution
			6	Study the basic principles of emission spectroscopy and the working of Flame photometer
S2	EE 110	Electrical Engineering Workshop	1	Gain knowledge about Electrical wiring accessories like cables, wires, switches, fuses, MCB, ELCB, MCCB. Etc…
			2	Ability to wire up fluorescent lamp and light circuit and to use house hold appliances.

			3	Ability to wire up conventional house wiring schemes like staircase wiring, godown wiring etc…
			4	Acquisition of knowledge in power wiring with protective devices.
			5	To wire up inverter connection with all protective measures.
			6	Ability to measure different parameters like voltage, current, power, resistance etc... with conventional meters and equipments.
S2	EC 110	Electronics Engineering Workshop	1	The course helps in identifying different active and passive components and testing of these components
			2	It provides a basic idea on how to use an EDA tool and interpretation of data sheets
			3	It provides knowledge on how to use different electronic instruments
			4	The workshop helps in attaining knowledge on inter connection of different components on broad band as well as on PCB using soldering methods
			5	Students will be able to fabricate single sided PCB for simple circuit using manual etching
			6	Students attain knowledge on how to assemble and dis mantle desktop computer and also to set up and identify the sub systems of a PA system and TV
S2	U100	Language Lab	1	Acquire the essential listening and summarizing skills.
			2	Improve the vocabulary by learning several new words and their meanings.
			3	Gain knowledge about the basics of English grammar, form sentences and conveying ideas properly.
			4	Understand the various aspects of reading and comprehension.
			5	Develop the presentation and soft skills.
			6	Assimilate the skills needed to perform flawlessly in interviews and group discussions by communicating effectively.
S3	MA201	Linear Algebra & Complex Analysis	1	Identify analytic functions and Harmonic functions
			2	Identify conformal mappings
			3	Evaluation of integrals using Cauchy’s integral formula.
			4	Evaluate real definite Integrals as application of Residue Theorem
			5	Solve any given system of linear equations
			6	Find the Eigen values of a matrix and how to diagonalize a matrix

S3	ME201	Mechanics of Solids	1	Will have the fundamental knowledge of the concepts of stress, strain in mechanics of solids and structures, material properties.
			2	Will be able to apply the fundamental concepts of principle of superposition, equilibrium, compatibility, force-deformation, and stress-strain relationships to the solid and structural mechanics problem.
			3	Will be able to identify the strength characteristics of various structural members subjected to torsion loads.
			4	Will be able to identify the strength characteristics of various structural members subjected to bending loads.
			5	Will be able to solve structural problems involving deformation of beams and plane stress and strains
			6	Will have the ability to develop and analyze a basic design structures under combined loading by computing compound stresses and strains and also able to solve problems involving columns.
S3	ME203	Mechanics of Fluids	1	Understand the fundamentals of fluid mechanics and basic laws of static fluids.
			2	Understand the kinematics of fluid particles, including the concepts of flow patterns, basic flow fields, vorticity and circulation.
			3	Ability to apply the Bernoulli's equation to solve problems in flow measuring devices.
			4	Ability to analyse internal flow in pipes and channels by the head loss equation, moody chart and Chezy's equation.
			5	Understand the boundary layer concept, lift, drag flow separation and drag reduction fundamentals.
			6	Use dimensional analysis to design physical or numerical experiments and to apply dynamic similarity.
S3	ME205	Thermodynamics	1	Aquired knowledge about basic concepts in Thermodynamics, importance of zeroth law, temperature measurements and associated calculations
			2	Aware about the first law and its application in real life situations
			3	Aware about Importance of second law, associated concepts and its influence on natural process. Ability to solve Related problems
			4	A good understanding of availability concept and property diagrams
			5	Knowledge on various equations aof state and calculations on gas mixtures
			6	Good understanding on property relations and combustion process
S3			1	Identify the crystal structures of metallic materials.

	ME210	Metallurgy and Materials Engineering	2	Analyze the binary phase diagrams of alloys Fe-Fe3C, etc.
			3	Correlate the microstructure with properties, processing and performance of metals.
			4	Recognize the failure of metals with structural change.
			5	Select materials for design and construction.
			6	Apply core concepts in materials science to solve engineering problems.
S3	HS210	Life Skills	1	Communicate effectively and make effective presentations.
			2	Write different types of reports.
			3	Face interview & group discussion.
			4	Critically think on a particular problem and solve problems.
			5	Work in group & teams and become an effective leader
			6	Handle Engineering Ethics and Human Values.
S3	ME231	Computer Aided Machine Drawing Lab	1	Understand the basics and standards of engineering drawing related to machines and components.
			2	To develop technical skills regarding assembly, production and part drawings.
			3	To familiarize students with various limits, fits and tolerances.
			4	To help students gain knowledge about standardCAD packages on modeling and drafting.
			5	
			6	
S3	CE230	Material Testing Lab	1	The students should be able to undertake the testing of materials when subjected to different types of loadings
			2	The students should be able to relate the testing procedures to the theory of mechanics of materials
			3	The students should be able to systematically record laboratory proceedings and calculations
			4	The students should be able to evaluate the test results and understand implications
			5	
			6	
S4	MA202	Probability Distribution Transformation and Numerical	1	To have a concept of discrete probability density functions and probability distributions like binomial distribution and Poisson distribution
			2	To have a concept of continuous probability density functions and probability distributions like Normal, Gamma and Exponential distribution

			3	To use Fourier integrals and Fourier transforms in solving various engineering problems
			4	To understand the concept of Laplace and inverse Laplace transforms and apply them to solve ordinary differential equations
			5	To use the iteration and interpolation methods to solve engineering problems
			6	To use the concept of numerical methods and their applications to solve linear systems and first order ODE's
S4	ME 202	Advanced Mechanics of Solids	1	Students will understand the fundamental concepts of stress and strain and the relationship between stress and strain
			2	Students will be expected to relate loading and deformation states in various mechanical components of practical applications and complex structures
			3	Students will be expected to solve general bending problems
			4	Students will be expected to apply energy methods in structural mechanics problems
			5	Students will solve problems relating to torsion of non circular sections
			6	students will acquire fundamental knowledge in mechanics of materials for application in practical engineering structure
S4	ME 204	Thermal Engineering	1	The students will be able to understand the basic concepts of vapour power cycles and their application in formulating the steam engineering problems
			2	Ability to produce preliminary thermodynamic design of steam turbines.
			3	Ability to distinguish various air standard cycles and different kinds of IC Engines.
			4	Intelligent to evaluate performances of IC Engines.
			5	Capability to define combustion phenomena in engines and therefore can suggest and propose novel methods for reducing exhaust emissions.
			6	Ability to understand different type of gas turbines cycle.
S4	ME 206	Fluid Machinery	1	Ability to classify the various hydraulic machines based on mode of energy transfer.
			2	Ability to design and develop simple system for hydraulic power generation.
			3	Ability to design and develop simple hydraulic pumping system.
			4	Developed confidence in various hydraulic equipments for various engineering applications

			5	Good understand on various types of air compressors, calculation of their performance and basic designs
			6	
S4	ME 220	Manufacturing Technology	1	To acquire knowledge about various casting process
			2	To understand various rolling process required to getting required shape
			3	To discuss important aspects of various forging processs
			4	To discuss sheet metal working process
			5	To acquire knowledge about various types of forming and spinning process
			6	To acquire knowledge about various types of welding process and their applications
S4	HS 200	BUSINESS ECONOMICS	1	Make investment decisions based on capital budgeting methods in alignment microeconomic and macroeconomic theories.
			2	Able to analyse the profitability of the firm, economy of operation, determination of price under various market situations with good grasp on the effect of trade cycles in business.
			3	Gain knowledge on monetary theory, measures by RBI in controlling interest rate and emerging concepts like bitcoin.
			4	Gain knowledge of elementary accounting concepts used for preparing balance sheet and its interpretation.
			5	Identify the need for various credit control methods and the significance of national income concepts.
			6	Understand the functioning of the Indian capital and money markets and the tax system.
S4	ME 232	Thermal Engineering Lab	1	Able to determine the efficiency and plot the characteristic curves of different types of Internal Combustion engines
			2	To determine the efficiency and plot the characteristic curves of compressors
			3	To determine the efficiency and plot the characteristic curves of blower
			4	Able to Analyze of automobile exhaust gas
			5	To Conduct experiments for the determination of viscosity, calorific value etc of petroleum products
			6	Ability to use CFD tools such as Ansys Fluent to perform numerical predictions of flow characteristics in external and internal flows.
S4	ME 230	Fluid Mechanics & Machines Lab	1	Ability to use different plumbing tools to construct piping systems

			2	Ability to calibrate flow rate measuring devices such as Venturimeter, orifice meter and notches.
			3	Ability to measure the frictional losses in fluid flow and characterize laminar and turbulent flows.
			4	Ability to understand the importance of stability of the floating body.
			5	Ability to find the performance characteristics of hydraulic turbines and pumps under different working conditions.
			6	Ability to design of a piping systems and selection of suitable pump for transmission of drinking water.
			7	Ability to use CFD tools such as Ansys Fluent to perform numerical predictions of flow characteristics in external and internal flows.
S5	ME 301	MECHANICS OF MACHINERY	1	Students will be able to reproduce equivalent linkages of real life systems
			2	Computer programs can be developed for finding velocity and acceleration at any point in a link of a mechanism
			3	Students will be able to design mechanism and cams for a specified motion characteristic
			4	Students will be able to design gear trains for specific applications
			5	Students will be able to design linkages mechanisms having practical applications
			6	Students will be able to utilize analytical, mathematical and graphical aspects of kinematics of machines for effective design
S5	M3 303	MACHINE TOOLS & DIGITAL MANUFACTURING	1	To introduce the students to the scientific principles underlying material behaviour during manufacturing process
			2	To understand various m/c tools such as lathe , drilling m/c & their operations
			3	To understand various reciprocating machines & their operations
			4	To impart knowledge of appropriate parameters to be used for various machining operations
			5	to develop knowledge on the importance of milling, grinding and superfinishing in metal cutting process
			6	To introduce the fundamentals of digital manufacturing
S5	ME 305	COMPUTER PROGRAMMING & NUMERICAL METHODS	1	To introduce the basics of computer program with the help of C++
			2	To teach students various control statements used in C++ with the help of examples
			3	To teach the students the basics of pointers and various programs like matrix multiplication, infinite series etc.

			4	To familarize the students with various features of object oriented programming
			5	Teach students various methods of solving linear system of equations
			6	To help the students to study curve fitting and solutions of PDEs and preparation of computer programs for these methods
S5	EE 311	ELECTRICAL DRIVES & CONTROL FOR AUTOMATION	1	To understand the working principle, construction and operation of DC generators
			2	To understand the fundamentals and concepts of DC motors
			3	To have sound knowledge on performance of transformers
			4	To understand the operation of three phase induction motor and methods of starting
			5	To attain knowledge about single phase motors and synchronous machine
			6	To understand about stepper motors and controllers for automation
S5	HS 300	PRINCIPLES OF MANAGEMENT	1	A student who has undergone this course would be able to manage people and organisations
			2	A student who has undergone this course would be able to critically analyse and evaluate management theories and practices
			3	A student who has undergone this course would be able to plan and make decisions for organisations
			4	A student who has undergone this course would be able to do staffing and related HRD functions
S5	ME 363	COMPOSITE MATERIALS AND MECHANICS	1	Able to understand various types of composite materials
			2	Able to understand various matrices and reinforcements
			3	Familiar with polymer matrix composites, its manufacturing and applications
			4	Familiar with metal matrix composites, its manufacturing and applications
			5	Familiar with ceramic matrix composites, its manufacturing and applications
			6	Able to understand post processing and micromechanics of composites
S5	ME 367	NON-DESTRUCTIVE TESTING	1	Students will be able to differentiate various defect types & select the appropriate NDT methods for specimen.
			2	Students will be able to use liquid penetrant inspection

			3	Students will acquire adequate knowledge about magnetic particle inspection
			4	Students will be able to identify the need for ultra sonic testing
			5	Students will be able to use radiography testing effectively
			6	Students will get idea about advantages and disadvantages of visual inspection
S5	ME 373	HUMAN RELATIONS MANAGEMENT	1	Understand basics of human behaviour
			2	Analyse group behaviour and building teams
			3	Manage ethics and discipline in human relations
			4	Understand employment laws and collective bargaining in organisations
			5	Manage employer-employee relations
			6	Manage conflicts in organisations and build human relations
S5	ME 341	DESIGN PROJECT	1	To understand the engineering aspects of design with reference to simple products
			2	To design products, processes or systems innovatively
			3	Think innovatively on the development of components, products, processes or technologies in the engineering field
			4	Analyse the problem requirements and arrive workable design solutions
S5	EE335	ELECTRICAL AND ELECTRONICS LAB	1	Ability to determine the various characteristics of DC machines like OCC, efficiency, armature reaction and load test and interpret the results.
			2	Capability to predetermine the regulation of synchronous generators by emf and mmf methods.
			3	Predetermination of efficiency, regulation and losses in single phase transformers.
			4	Knowledge on types of starting methods for induction machines and conducting load tests to comment on efficiency.
			5	Capability to Generate various waveshapes using wave shaping circuits
			6	Ability to analyze and design electronic circuits such as amplifiers, oscillators and voltage regulators.
S5	ME 331	MANUFACTURING TECHNOLOGY LAB I	1	Identify various process parameters and their influence on surface properties of various metals.
			2	Recommend appropriate speed, feed and depth of cut for various processes on lathe machine.
			3	Position, hold and locate work material and cutting tools in various basic machine tools.

			4	Choose suitable welding process for different metals.
			5	Choose appropriate heat treatment process for different metals
			6	
S6	ME 302	Heat And Mass Transfer	1	A good understanding about various modes of heat transfer along with detailed concept in conduction heat transfer
			2	Capability to solve convection Heat Transfer Problems with help of various non-dimensional numbers and their emperical relations
			3	Ability to design and analyse various types of fins
			4	Ability to design and analyse various Heat Exchangers
			5	Detailed concept in Radiation Heat Transfer and radiation shields
			6	Ability to solve mass transfer problems both convective and diffussive
S6	ME 304	Dynamics Of Machinery	1	Understand the basics of force analysis of machinery
			2	Understand the basics of force analysis of balancing of rotating and reciprocating masses
			3	Understand the basics of Gyroscope
			4	Understand the basics of energy fluctuation in machines
			5	Understand the basics of vibration and its physical significance
			6	Develop and design practical problem solving skills in design problems of mechanism
S6	ME 306	Advanced Manufacturing Technology	1	To introduce machining principles and processes in the manufacturing of precision components and products that use conventional and nonconventional technologies.
			2	To give basic understanding of the machining capabilities, limitations, and productivity of advanced manufacturing processes.
			3	To describe how PLC’s operate and how they control automated equipment and systems
			4	To demonstrate tool path simulations with CNC powered equipment
			5	To introduce CNC programming
			6	
S6	ME 308	Computer Aided Design And Analysis	1	The students will understand how CAD technology can leverage the design process
			2	The students will understand the basic mathematical fundamentals of CAD geometric transformation
			3	Knowledgeable about representation of geometric entities in surface modelling

			4	Knowledgeable about various modelling techniques enabling prediction of product quality prior to fabrication
			5	The students will have knowledge about mathematical background of finite element analysis
			6	Ability to solve structural mechanics problems using FEM
S6	ME 312	Metrology And Instrumentation	1	To understand the working of linear and angular measuring instrument
			2	To the fundamentals of limits and limits gauges
			3	To get and exposure to advance measuring instruments
			4	To acquire an overview of mechanical measuring instruments
			5	To get basic idea about the working principle and application of torque, stress and strain
			6	To provide the basic idea about temperature measuring instruments
S6	ME366	ADVANCED METAL JOINING TECHNOLOGY (E2)	1	To expose the students to the fundamental concepts of advanced welding technologies and their relevance
			2	Apply the knowledge of solid state welding process for engineering applications
			3	Understand the principles of radiant energy metal joining process
			4	Understand the fundamental principles of special arc welding process
			5	Understand the knowledge of plasma arc in metal joining and cutting process
			6	Understand the knowledge of design principles in weld joints. Apply the concept of quality control and testing of weldments in industrial environment
S6	ME 374	THEORY OF VIBRATION	1	Knowing and understanding vibration fundamentals, harmonic motions and damped free vibration of single degree of freedom systems
			2	Understand the forced vibration of single degree of freedom systems and application of vibration isolation, transmissibility and solve real life vibration problems
			3	Evaluation of the natural frequency, mode shape and coordinate coupling in two degree of freedom systems
			4	Understand multi degree freedom systems, influence coefficients and modal analysis
			5	Deriving the governing equations of continuous systems and their solution for different boundary conditions
			6	Solving transient vibration problems and concepts in random and non liner vibrations

S6	ME 376	MAINTENANCE ENGINEERING	1	Extend knowledge in maintenance, relaibility, maintainability and availability of system.
			2	Explain the various maintenance strategies and how it is chosen in a given condition
			3	Explain the various monitoring system used to identify faults.
			4	define the various failure modesand analysis of failures.
			5	extend the knowledge in maintenance by studying modern maintenace tools and strategies.
			6	Explain planning, schedulingand cost associated with maintenance.
S6	ME 332	Computer Aided Design And Analysis Lab	1	Gain working knowledge in computer aided design methods & procedure
			2	Able to procedure CAD drawing & understand manufacturing details, standards & specifications.
			3	Able to solve design & manufacturing problems using sound engineering principles and practices.
			4	Able to solve simple structural, heat and fluid flow problems using standard software.
S6	ME 352	Comprehensive Exam	1	To assess the comprehensive knowledge gained in basic courses relevant to the branch of study.
			2	To comprehend the questions asked and answer them with confidence.
S6	ME 334	Manufacturing Technology Lab II	1	To provide programming practice on CNC machine tools
			2	To impart knowledge on the fundamental concepts and principles of metrology
			3	To explain the need of various modern measuring instruments and precision measurements
S7	ME 401	DESIGN OF MACHINE ELEMENTS I	1	To review the concepts of statics & strength of materials
			2	To introduce fundamental approaches to failure prevention of components
			3	To provide knowledge in the design of shafts
			4	To provide knowledge in the design of springs
			5	To provide knowledge in the design of cotter joints and couplings
			6	
S7	ME 403	ADVANCED ENERGY ENGINEERING	1	The students will be able to Understand energy scenario and the environmental effects of energy conversion.
			2	The students Become aware of different ways for utilizating solar energy

			3	Students will acquire knowledge about different ways to harness wind energy & utilize it for various human needs
			4	The students Become aware of different ways for utilizating biomass energy
			5	The students Become aware of different renewable energy sources and choose sustainable energy for future
			6	The students Become aware of Environmental impact on usage of renewable energy sources
S7	ME 405	REFRIGERATION AND AIR CONDITIONING	1	The students will be able to understand the principles refrigeration, air-conditioning and basic design considerations of air refrigeration system.
			2	The students will be able to carry out preliminary analysis of real Vapour Compression refrigeration cycles
			3	The students will be able to distinguish types of rfrigerants and non conventional refrigeration systems adaptable to market demands and environmental requirements
			4	The students will be acquire knowledge to select suitable components and instrumentation for a given refrigeration system
			5	Ability to perform psychrometric calculation, heating/cooling load calculations, humidity control and analysis for air-conditioning processes
			6	Capability to distinguish various A/C systems and Ability to layout basic design of air distribution for different applications.
S7	ME 407	MECHATRONICS	1	Student has knowledge about various types of sensors used in Mechatronics
			2	Student has knowledge in actuators used I Mechatronics
			3	Knowledge in fabrication and functioning of MEMS pressure and inertial sensors
			4	Knowledge in Mechatronic components of a CNC Machine
			5	Concept of mathematical modelling of systems, drives and sensors in Robotics
			6	Idea of various image acquisition and image processing techniques
S7	ME 409	COMPRESSIBLE FLUID FLOW	1	Students will be able to understand the physical difference between incompressible, subsonic and supersonic flow and derive the reference velocities
			2	Formulate and solve problems in the one dimensional steady isentropic nozzle flow

			3	Students will be able to derive the normal shock equations and find the wave shock shock strength for wedge shaped and concave corners
			4	Students will be able to formulate and solve problems of one dimensional steady Fanno flow
			5	Students will be able to formulate and solve problems of one dimensional steady Rayleigh flow
			6	Students will be able to know the various measuring instruments used in compressible flow
S7	IE306	SUPPLY CHAIN AND LOGISTICS MANAGEMENT	1	To understand the structures and decision phase of supply chain
			2	To explore the tools os supply chain
			3	To understand the strategic decision tools of sc
			4	To develop an idea about inventory models
			5	To understand the concept of logistics management
			6	To explore the tools used in logistics management
S7	ME 467	CRYOGENIC ENGINEERING	1	The students gain knowledge about the historical background, present areas involving cryogenic engineering and properties of engineering materials at cryogenic temperatures.
			2	The students gain knowledge about the methods of production of low temperature,pay off functions to indcate the performance of liquefaction systems and ideal liquefaction systems
			3	The students will be able to know about various liquefaction systems and their critical components
			4	The students gain nknowledge about various cryogenic refrigeration systems.
			5	The students gain knowledge about cryogenic fluid storage and transfer systems, their design aspects and types of insulations used in cryogenic equipments
			6	The students will be able to gain knowledge about cryogenic instrumentation and heat exchangers used in cryogenic systems.
S7	ME 469	FINITE ELEMENT ANALYSIS	1	CO 1: Derive finite element formulation for 1D element using direct stiffness approach
			2	CO 2: Derive finite element formulation for beam element and understand local and global coordinate transformation
			3	CO 3:Understand interpolation function and variational principle
			4	CO 4: Understand finite element formulation using Rayleigh-Ritz method
			5	CO 5: Study the concepts of higher order and isoparametric elements

			6	CO 6: Understand finite element formulation using weighted residual method
S7	ME 451	SEMINAR & PROJECT PRELIMINARY	1	To develop skills in doing literature survey, technical presentation and report preparation.
			2	To enable project identification and execution of preliminary works on final semester project
S7	ME 431	MECHANICAL ENGINEERING LAB	1	To develop engineering related skills of fluid mechanics and prime movers
			2	To provide necessary practical knowledge related to the theory of fluid mechanics and energy conversion systems.
			3	To familiarize with various apparatus and machines in fluid mechanics and IC engines and conduct experiments.
S8	ME 402	Design Of Machine Elements II	1	To provide basic design methods for clutches, brakes, belt drives, bearings, gears and connecting rod
			2	To introduce the design modifications to be considered for ease of manufacturing.
			3	Apply design procedures for industrial requirements.
			4	Design machine components to ease the manufacturing limitations.
S8	ME404	Industrial Engineering	1	To understand the relevence of IE and its economic impacts
			2	To know about the types of layout and material handling techniques
			3	To understand motion study and job evaluation methods
			4	To understand the psychological attitude towards work and safety
			5	To know about production planning and control and inventory control
			6	To understand quality control and inspection techniques
S8	ME 476	MATERIAL HANDLING AND FACILITIES PLANNING	1	Assess the value of facility planning on the strategy of a firm
			2	Develop a systematic plant layout
			3	Know the environmental and economic aspects in facilities planning
			4	Understand various material handling system
S8	ME 462	Propulsion Engineering	1	To impart knowledge on fundamentals of propulsion and types of propulsive engines used
			2	Understand the thermodynamic analysis of a Turbojet engine cycle

			3	Perform a detailed study on the different components of a Turbojet Engine
			4	Learn the basics of Rocket propulsion and solid propellant grain configurations
			5	Learn the basics ofLiquid propellant rockets feed system and basics of Combustion Instability
			6	To know the basic procedure of Rocket testing and safeguards
S8	ME 492	Project	1	To explore and understand the current topics of professional interest.
			2	To formulate and present an innovative project idea before a targeted audience
			3	:To identify the engineering problem correlating the theories in the selected area
			4	To theoretically model, analyse and solve an engineering problem of interest.
			5	To develop an ability to use modern engineering tools and work in a team
			6	To develop the skill to prepare a project report and technically write a manuscript