ACHARYA INSTITUTE OF TECHNOLOGY

Department of Mechanical Engineering

Bengaluru-560107

2018-19

1st YEAR

DEPARTMENT	ME	SEMESTER	1	COURSE CODE	18EGDL15	COURSE ID	C105
COURSE TITLE		ENGINEERING GRAPHICS					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C105.1		Able to have the knowledge of different coordinate system and drafting software solid edge V19					
C105.2		Able to draw the orthographic projections of points, lines, planes, solids and isometric projections					
C105.3		Able to develop the lateral surfaces of prisms and pyramids					
C105.4							
C105.5							

DEPARTMENT	ME	SEMESTER	2	COURSE CODE	18ME25	COURSE ID	C115
COURSE TITLE		ELEMENTS OF MECHANICAL ENGINEERING					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C115.1		Able to gain knowledge on various energy resources, boilers, prime movers, robots & automation, refrigeration & air conditioner.					
C115.2		Able to understand different joining techniques, metal removal process, boilers, IC engines, refrigeration and air conditioner					
C115.3		Able to apply and use of various engineering materials, refrigeration & air conditioner and different machine tool operation.					
C115.4		Able to compare between 2 strokes and 4 stroke engines, welding process, machining operations and refrigeration system					
C115.5							

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2nd YEAR

DEPARTMENT	ME	SEMESTER	3	COURSE CODE	17ME32	COURSE ID	C202
COURSE TITLE		MATERIAL SCIENCE					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C202.1		Able to understand the properties of engineering materials and their behavior					
C202.2		Able to describe the procedure of heat treatment and processing of composite materials					
C202.3		Able to understand the potentialities of various materials and material selection procedure					
C202.4							
C202.5							

DEPARTMENT	ME	SEMESTER	3	COURSE CODE	17ME33	COURSE ID	C203
COURSE TITLE		BASIC THERMODYNAMICS					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C203.1		Able to learn about the fundamentals of energy interactions, laws of thermodynamics along with various processes involved and properties.					
C203.2		Able to understand and obtain the relationship between different temperature scale, energy and its property.					
C203.3		Able to apply conservation of energy, the laws of thermodynamics in various systems.					
C203.4							
C203.5							

DEPARTMENT	ME	SEMESTER	3	COURSE CODE	17ME34	COURSE ID	C204
COURSE TITLE		MECHANICS OF MATERIAL					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C204.1		Able to define Elastic Properties of Materials, Different types of stress due to application of loads and energy stored in various structural members.					
C204.2		Able to comprehend the relation for stress and strain distribution, Shear force and Bending moment diagram, Torque and stability of columns from failure theories					
C204.3		Able to apply the known and comprehended concepts and to calculate the stresses, strains and strain energy in Bars, Cylinders, Beams, Shafts, and Columns.					
C204.4		Able to analyze the stresses and strains for plane stress condition analytically and graphically for structural members and analyze stress distribution for thick and thin cylinders.					

C204.5							
DEPARTMENT	**ME**	**SEMESTER**	**3**	**COURSE CODE**	**17ME35A**	**COURSE ID**	**C205**
COURSE TITLE		**METAL CASTING AND WELDING**					
COURSE OUTCOME NO		**COURSE OUTCOME STATEMENTS**					
C205.1		Able to gain Knowledge about casting, welding, soldering brazing process and solidification					
C205.2		Able to describe molds, castings, welding, solidification process, inspection methods and furnaces. Also describe soldering, brazing methodologies.					
C205.3		Able to apply different casting, joining and inspection methods depending on requirement.					
C205.4							
C205.5							
DEPARTMENT	**ME**	**SEMESTER**	**3**	**COURSE CODE**	**17ME36A**	**COURSE ID**	**C206**
COURSE TITLE		**COMPUTER AIDED MACHINE DRAWING**					
COURSE OUTCOME NO		**COURSE OUTCOME STATEMENTS**					
C206.1		Able to draw orthographic projections and sectional views of standard primitives and Machine components.					
C206.2		Able to draw orthographic projections of standard thread forms, joints and couplings.					
C206.3		Able to create/model parts and assembly of machine components using Solid edge.					
C206.4							
C206.5							
DEPARTMENT	**ME**	**SEMESTER**	**3**	**COURSE CODE**	**17MEL37A**	**COURSE ID**	**C207**
COURSE TITLE		**MATERIAL TESTING LAB**					
COURSE OUTCOME NO		**COURSE OUTCOME STATEMENTS**					
C207.1		Able to gain knowledge to conduct material tests to find different material properties. Also to gain knowledge about the heat treatment processes and non- destructive tests.					
C207.2		Able to understand and demonstrate different microstructures of the material.					
C207.3		Able to implement different strength and characteristic tests of a material depending on the application.					
C207.4							
C207.5							

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DEPARTMENT	ME	SEMESTER	3	COURSE CODE	17MEL38A	COURSE ID	C208
COURSE TITLE		FOUNDRY AND FORGING LAB					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C208.1		Able to have the Knowledge on the preparation of foundry sand and its testing, understanding on basic foundry and forging operations along with the tools involved in each of the process					
C208.2		Able to describe different parameters involved in sand moulding, identify the importance of sand testing and its effects on the final quality of the mould.					
C208.3		Able to perform basic foundry and forging operations to obtain the desired shapes and with the prescribed quality.					
C208.4		Able to compare and Analyse the effect of sand and its composition on the strength of the mould using various testing procedures.					
C208.5							

DEPARTMENT	ME	SEMESTER	4	COURSE CODE	17ME42	COURSE ID	C212
COURSE TITLE		Kinematics of Machinery					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C212.1		Able to illustrate the terminology of mechanisms					
C212.2		Able to identify the degrees of freedom and motion characteristics of planar mechanisms.					
C212.3		Able to predict the motion of planar mechanisms graphically and mathematically.					
C212.4		Able to describe the characteristics of motion in gears with involute profile					
C212.5		Able to calculate the velocity ratio or number of teeth for an epicyclic gear train drive.					
C212.6		Able to draw the profile of the cam for a desired follower motion.					
DEPARTMENT	ME	SEMESTER	4	COURSE CODE	17ME43	COURSE ID	C213
COURSE TITLE		Applied Thermodynamics					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C213.1		Able to outline the Gas power cycles, vapour power cycles and know how fuel burns and their thermodynamic properties.					

C213.2		Able to explain the performance and mechanisms of gas power cycle, steam power cycle and refrigeration system					
C213.3		Able to compute the performance of gas power plant, steam power plant, IC Engine, Reciprocating compressors and refrigeration system.					
C213.4							
C213.5							
DEPARTMENT	**ME**	**SEMESTER**	**4**	**COURSE CODE**	**17ME44**	**COURSE ID**	**C214**
COURSE TITLE		**Fluid mechanics**					
COURSE OUTCOME NO		**COURSE OUTCOME STATEMENTS**					
C214.1		Able to understand the basics of fluid properties, statics, dynamics, kinematics, concept of boundary layer in fluid flow as well as CFD					
C214.2		Able to explain the principle of buoyancy and flotation, laminar and turbulent flow, flow across body and checking dimensional homogeneity					
C214.3		Able to calculate the key fluid properties, meta centric height, lift, drag and applying Bernoulli's equation to devices					
C214.4							
C214.5							
DEPARTMENT	**ME**	**SEMESTER**	**4**	**COURSE CODE**	**17ME45B**	**COURSE ID**	**C215**
COURSE TITLE		**Machine Tools and Operations**					
COURSE OUTCOME NO		**COURSE OUTCOME STATEMENTS**					
C215.1		Able to describe various machine tools, machining processes, mechanics of machining and cutting tool materials.					
C215.2		Able to explain the mechanism of machining processes, cutting tool materials, tool nomenclature, tool wear, tool life and economics of machining processes					
C215.3		Able to estimate the effect of machining processes and parameters on surface finish, tool wear, tool life and machining efficiency.					
C215.4							
C215.5							
DEPARTMENT	**ME**	**SEMESTER**	**4**	**COURSE CODE**	**17ME46B**	**COURSE ID**	**C216**
COURSE TITLE		**Mechanical Measurements and Metrology**					
COURSE OUTCOME NO		**COURSE OUTCOME STATEMENTS**					

C216.1	Define terms associated to metrology, measurements, measuring equipment's.						
C216.2	Explain different measuring instruments and their utilization.						
C216.3	Illustrate the measurement of force, torque, pressure, strain, temperature, screw and gear profile.						
C216.4							
C216.5							
DEPARTMENT	**ME**	**SEMESTER**	**4**	**COURSE CODE**	**17MEL47B**	**COURSE ID**	**C217**
COURSE TITLE	**Mechanical Measurements and Metrology Lab**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C217.1	Able to gain knowledge on how to use different metrology measuring instruments						
C217.2	Able to understand and demonstrate different measuring instruments						
C217.3	Able to illustrate the measurement of force, torque, pressure, strain, temperature, screw and gear profile etc.,						
C217.4							
C217.5							
DEPARTMENT	**ME**	**SEMESTER**	**4**	**COURSE CODE**	**17MEL48B**	**COURSE ID**	**C218**
COURSE TITLE	**Machine Shop**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C218.1	Able to gain knowledge on different machining methodologies						
C218.2	Able to describe and demonstrate machining operations.						
C218.3	Able to illustrate different machining techniques depending on the requirement.						
C218.4							
C218.5							

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3rd YEAR

DEPARTMENT	ME	SEMESTER	5	COURSE CODE	15ME51	COURSE ID	C301
COURSE TITLE		MANAGEMENT AND ENGINEERING ECONOMICS					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C301.1		Understand needs, functions, roles, scope and evolution of Management; Importance, purpose of Planning and hierarchy of planning and also analyze its types.					
C301.2		Understanding of why economics Is important to engineers, basic interest calculations.					
C301.3		Discuss Decision making, Organizing, Staffing, Directing and Controlling					
C301.4		How to arrive at the Selling Price of a component, cost components involved in manufacturing product.					
C301.5		To evaluate assests/ projects and choose alterntaives based on the investment today					
DEPARTMENT	ME	SEMESTER	5	COURSE CODE	15ME52	COURSE ID	C302
COURSE TITLE		DYNAMICS OF MACHINES					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C302.1		Describe motion, static and dynamic equilibrium conditions for different mechanisms and machine elements.					
C302.2		Understand force transmission and balancing in different mechanisms and also principles of vibrations of single degree of freedom mechanical systems					
C302.3		Solve problems on force transmission and balancing in different mechanisms and vibration characteristics of single degree of freedom mechanical systems.					
C302.4		Explain force transmission and vibration characteristics in different mechanical systems.					
C302.5							
DEPARTMENT	ME	SEMESTER	5	COURSE CODE	15ME53	COURSE ID	C303
COURSE TITLE		TURBO MACHINES					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C303.1		Able to define basic definitions of turbomachines and sketching of velocity triangles for different flow turbomachines.					
C303.2		Able to derive or Obtain expressions for different flow type turbomachines during energy transfer.					
C303.3		Able to apply the derived equations and knowledge of turbomachines in solving numerical problems					

C303.4							
C303.5							
DEPARTMENT	ME	SEMESTER	5	COURSE CODE	15ME54	COURSE ID	C304
COURSE TITLE		DESIGN OF MACHINE ELEMENTS-1					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C304.1		Understand basic of Mechanical Design procedure, material properties and selection of material, codes and standards.					
C304.2		Design machine components for static, impact and fatigue strength.					
C304.3		Design fasteners, shafts, keys, couplings, riveted and welded joints,					
C304.4		Analyze the stress level and deformation in the different parts of the machine components, to determine the dimensions of the component.					
C304.5							
DEPARTMENT	ME	SEMESTER	5	COURSE CODE	15ME554	COURSE ID	C305
COURSE TITLE		NON TRADITIONAL MACHINING					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C305.1		To understand the importance and different types of non-traditional machining methods.					
C305.2		Able to explain principle and procedure of various NTM processes					
C305.3		Illustrate the process parameters, limitations, advantages and applications of different NTM processes.					
C305.4							
C305.5							
DEPARTMENT	ME	SEMESTER	5	COURSE CODE	15ME563	COURSE ID	C306
COURSE TITLE		AUTOMATION AND ROBOTICS					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C306.1		Classify various types of automation and manufacturing systems.					
C306.2		Discuss different robot configurations, motions, drive systems, and its performance parameters.					
C306.3		Describe the basic concepts of control systems, feedback components, actuators, and power transmission systems used in robots.					
C306.4		Explain the working of transducers, sensors, and machine vision systems.					
C306.5		Discuss the future capabilities of sensors, mobility systems and artificial intelligence in the field of robotics.					

DEPARTMENT	ME	SEMESTER	5	COURSE CODE	15MEL57	COURSE ID	C307
COURSE TITLE		FLUID MECHANICS AND MACHINERY LAB					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C307.1		Able to define fluid mechanics, fluid and their properties					
C307.2		Able to obtain or derive mathematical relation and conduct the experiment					
C307.3		Able to calculate the efficiency and discharge by the machineries					
C307.4							
C307.5							

DEPARTMENT	ME	SEMESTER	5	COURSE CODE	15MEL58	COURSE ID	C308
COURSE TITLE		ENERGY LAB					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C308.1		Able to define basic terms and performance parameters of IC engines					
C308.2		Able to write the Procedure of working of various IC engine equipments and measuring apparatus					
C308.3		Able to calculate the performance parameters of IC engines, properties of fuel and lubricating oils					
C308.4							
C308.5							

DEPARTMENT	ME	SEMESTER	6	COURSE CODE	15ME61	COURSE ID	C311
COURSE TITLE		Finite Element Analysis					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C311.1		Able to know the principles of energy methods, stress conditions and finite element method.					
C311.2		Able to Derive shape functions & stiffness matrices for different finite elements.					
C311.3		Able to obtain Stiffness matrix and Load vector of bar, Truss, Beams, Conduction elements					
C311.4		Able to solve problems on Bar, Truss, Beams, Heat Transfer, Numerical Integration					
C311.5							

DEPARTMENT	ME	SEMESTER	6	COURSE CODE	15ME62	COURSE ID	C312
COURSE TITLE		Computer integrated Manufacturing					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C312.1		Able to define Automation, CIM, CAD, CAM, CNC, CNC program, Robotic systems, Additive manufacturing, Industry					

	4.0 and IOT.						
C312.2	Able to explain the basics of automated manufacturing industries through mathematical models and categorize different types of automated flow lines, robotic systems, additive manufacturing techniques.						
C312.3	Able to execute programs for various manufacturing processes and robot programming.						
C312.4	Able to analyze the automated flow lines to reduce time and enhance productivity						
C312.5	Able to visualize and appreciate the modern trends in Manufacturing like additive manufacturing, Industry 4.0 and applications of Internet of Things leading to Smart Manufacturing.						
DEPARTMENT	**ME**	**SEMESTER**	**6**	**COURSE CODE**	**15ME63**	**COURSE ID**	**C313**
COURSE TITLE	**Heat Transfer**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C313.1	Able to state the different modes of Heat Transfer						
C313.2	Able to derive the laws from the modes in Heat Transfer						
C313.3	Able to draw/ Apply the heat flow rate and effectiveness of conduction, convection and radiation heat transfer						
C313.4							
C313.5							
DEPARTMENT	**ME**	**SEMESTER**	**6**	**COURSE CODE**	**15ME64**	**COURSE ID**	**C314**
COURSE TITLE	**Design of Machine Elements -II**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C314.1	Able to define stresses in curved beams and springs						
C314.2	Able to select the flexible (belt, rope and chain) drives and gears.						
C314.3	Able to explain the stresses in curved beams, springs, power transmitting elements and IC engine parts.						
C314.4	Able to determine the stresses in curved beams, springs and gears.						
C314.5	Able to calculate the flexible drive sizes, breaks, clutch, bearings and IC engine parts						
DEPARTMENT	**ME**	**SEMESTER**	**6**	**COURSE CODE**	**15ME652**	**COURSE ID**	**C315**
COURSE TITLE	**Mechanics of Composite Materials**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C315.1	Able to identify the properties of fibre and matrix materials used in commercial composites, as well as some common manufacturing techniques.						
C315.2	Able to predict the failure strength of a laminated composite plate.						

C315.3	Able to understand the linear elasticity with emphasis on the difference between isotropic and anisotropic material behaviour.						
C315.4	Able to analysis, design, optimization and test simulation of advanced composite structures and Components						
C315.5							
DEPARTMENT	**ME**	**SEMESTER**	**6**	**COURSE CODE**	**15ME664**	**COURSE ID**	**C316**
COURSE TITLE	**Total Quality Management**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C316.1	Able to identify and demonstrate the principles of TQM, Quality Gurus, Leadership and Customer Satisfaction.						
C316.2	Able to describe the tools used in Quality Management						
C316.3	Able to apply the concept of Six Sigma and Statistical Process Control. Construct the Control Charts, Interpret the type of data and evaluate.						
C316.4							
C316.5							
DEPARTMENT	**ME**	**SEMESTER**	**6**	**COURSE CODE**	**15MEL67**	**COURSE ID**	**C317**
COURSE TITLE	**Heat Transfer Lab**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C317.1	Able to define basic terms and modes of heat transfer						
C317.2	Able to write the Procedure of working of various heat transfer equipments as well as refrigeration and Air conditioning system.						
C317.3	Able to calculate the heat transfer rate, heat transfer coefficients and performance of RAC by conducting experiments, also temperature distribution of steady and transient heat conduction using numerical approach.						
C317.4							
C317.5							
DEPARTMENT	**ME**	**SEMESTER**	**6**	**COURSE CODE**	**15MEL68**	**COURSE ID**	**C318**
COURSE TITLE	**Modelling and Analysis Lab**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C318.1	Able to finite Element Analysis & Applications						
C318.2	Able to comprehend natural frequency, Damping of single degree of vibrating systems, critical speed of shafts, pressure distribution in journal bearing						
C318.3	Able to calculate and interpret stress and strains using strain gauges, photo elastic compression and bending To orient and balance masses rotating in different planes.						
C318.4	Able to analyse stress concentration in rectangular plate with						

	hole and to analyse governor equilibrium speed, sensitivity and power.
C318.5	

4th YEAR

DEPARTMENT	**ME**	**SEMESTER**	**7**	**COURSE CODE**	**15ME71**	**COURSE ID**	**C401**
COURSE TITLE		**ENERGY ENGINEERING**					
COURSE OUTCOME NO		**COURSE OUTCOME STATEMENTS**					
C401.1		Able to Enable to comprehend the knowledge of fundamentals.					
C401.2		Able to understand various parameters related to the power plants.					
C401.3		Able to understand the mathematical relationship with respect to Economic Analysis of power plants.					
C401.4							
C401.5							
DEPARTMENT	**ME**	**SEMESTER**	**7**	**COURSE CODE**	**15ME72**	**COURSE ID**	**C402**
COURSE TITLE		**FLUID POWER SYSTEMS**					
COURSE OUTCOME NO		**COURSE OUTCOME STATEMENTS**					
C402.1		Enables to understand the Principle and components of Hydraulic and Pneumatic system.					
C402.2		Enables to understand the working of Hydraulics pumps and motors, able to calculate performance of Pumps and motors.					
C402.3		Understand Hydraulic and Pneumatic control components and their graphic symbols.					
C402.4		Able to design Hydraulic/Pneumatic Circuits. Understand					

	basic fluid power maintenance procedures.						
C402.5	Understand the usage of logic gates & multi cylinder applications.						
DEPARTMENT	**ME**	**SEMESTER**	**7**	**COURSE CODE**	**15ME73**	**COURSE ID**	**C403**
COURSE TITLE	**CONTROL ENGINEERING**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C403.1	Able to recognize control system and its types , control actions.						
C403.2	Able to determine the system governing equations for physical models (Electrical, Thermal, Mechanical, Electro Mechanical).						
C403.3	Able to calculate the gain of the system using block diagram and signal flow graph						
C403.4	Able to illustrate the response of 1st and 2nd order systems.						
C403.5	Able to determine the stability of transfer functions in complex domain and frequency domain.						
C403.6	Able to employ state equations to study the controllability and observability						
DEPARTMENT	**ME**	**SEMESTER**	**7**	**COURSE CODE**	**15ME745**	**COURSE ID**	**C404**
COURSE TITLE	**SMART MATERIALS AND MEMS**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C404.1	Identify the smart structures, vibration absorbers and MEMS.						
C404.2	Summarize the properties of shape memory alloy, reheological fluids and optical fibers.						
C404.3	Describe the sensor and actuator devices and characterize the smart structure.						
C404.4	Carryout the case studies of MEMS for performance and reliability accounting						
C404.5							
DEPARTMENT	**ME**	**SEMESTER**	**7**	**COURSE CODE**	**15ME751**	**COURSE ID**	**C405**
COURSE TITLE	**AUTOMOTIVE ELECTRONICS**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C405.1	Recall the basic concepts and electronic systems used in automobiles						
C405.2	Summarize different technological advances in automobiles including diagnostics of systems and sub systems.						
C405.3	Select sensors, actuators and control systems for different applications in automobiles						
C405.4							
C405.5							

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DEPARTMENT	ME	SEMESTER	7	COURSE CODE	15MEL76	COURSE ID	C406
COURSE TITLE		DESIGN LAB					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C406.1		Able to identify the longitudinal and Torsional single degree of vibrating systems, also to identify different types of Governors, Gyroscope.					
C406.2		Able to comprehend natural frequency, Damping of single degree of vibrating systems, critical speed of shafts, pressure distribution in journal bearing					
C406.3		Able to calculate and interpret stress and strains using strain gauges, photo elastic compression and bending and to orient and balance masses rotating in different planes.					
C406.4		Able to analyse stress concentration in rectangular plate with hole and to analyse governor equilibrium speed, sensitivity and power.					
C406.5							

DEPARTMENT	ME	SEMESTER	7	COURSE CODE	15MEL77	COURSE ID	C407
COURSE TITLE		CIM LAB					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C407.1		Able to write CNC part programs using CADEM simulation package for simulation of machining operations such as Turning, Drilling & Milling.					
C407.2		Able to understand write programs for Flexible Manufacturing Systems Robotics					
C407.3		Able to understand the operating principles of hydraulics, pneumatics and electro– pneumatic systems.					
C407.4							
C407.5							

DEPARTMENT	ME	SEMESTER	8	COURSE CODE	15ME81	COURSE ID	C411
COURSE TITLE		Operations Research					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C411.1		Able to define terminologies and procedures associated with different Operations Research techniques.					

C411.2	Able to describe the importance, Characteristics and limitations of OR techniques						
C411.3	Able to apply OR technique/strategies to solve industrial and managerial related problems.						
C411.4	Able to allocate and schedule the resources and optimum cost and time.						
C411.5	Able to review and evaluate project duration and Critical path.						
DEPARTMENT	**ME**	**SEMESTER**	**8**	**COURSE CODE**	**15ME82**	**COURSE ID**	**C412**
COURSE TITLE	**Additive manufacturing**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C412.1	Understand the different process of Additive Manufacturing. using Polymer, Powder and Nano materials manufacturing.						
C412.2	Analyse the different characterization techniques						
C412.3	Describe the various NC, CNC machine programing and Automation techniques						
C412.4							
C412.5							
DEPARTMENT	**ME**	**SEMESTER**	**8**	**COURSE CODE**	**15ME835**	**COURSE ID**	**C413**
COURSE TITLE	**PRODUCT LIFE CYCLE MANAGEMENT**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C413.1	Explain the various strategies involved in Product Life Cycle Management and Product Data Management						
C413.2	Carry out the decomposition and model simulation in product design						
C413.3	Implement structuring in new product development process.						
C413.4	Select the tools needed to forecast the technology innovation.						
C413.5	Carry out product structuring using virtual product development tools						

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ACHARYA INSTITUTE OF TECHNOLOGY

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2019-20

1ST YEAR

DEPARTMENT	ME	SEMESTER	1	COURSE CODE	18EGDL15	COURSE ID	C105
COURSE TITLE		ENGINEERING GRAPHICS					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C105.1		Able to have the knowledge of different coordinate system and drafting software solid edge V19					
C105.2		Able to draw the orthographic projections of points, lines, planes, solids and isometric projections					
C105.3		Able to develop the lateral surfaces of prisms and pyramids					
C105.4							
C105.5							
DEPARTMENT	ME	SEMESTER	2	COURSE CODE	18ME25	COURSE ID	C115
COURSE TITLE		ELEMENTS OF MECHANICAL ENGINEERING					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C115.1		Able to gain knowledge on various energy resources, boilers, prime movers, robots & automation, refrigeration & air conditioner.					
C115.2		Able to understand different joining techniques, metal removal process, boilers, IC engines, refrigeration and air conditioner					
C115.3		Able to apply and use of various engineering materials, refrigeration & air conditioner and different machine tool operation.					
C115.4		Able to compare between 2 strokes and 4 stroke engines, welding process, machining operations and refrigeration system					
C115.5							

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2ND YEAR

DEPARTMENT	ME	SEMESTER	3	COURSE CODE	18ME32	COURSE ID	C202
COURSE TITLE		Mechanics of Materials					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C202.1		Able to define Elastic Properties of Materials, Different types of stress due to application of loads and energy stored in various structural members.					
C202.2		Able to comprehend the relation for stress and strain distribution, Shear force and Bending moment diagram, Torque and stability of columns from failure theories					
C202.3		Able to apply the known and comprehended concepts and to calculate the stresses, strains and strain energy in Bars, Cylinders, Beams, Shafts, and Columns.					
C202.4		Able to analyze the stresses and strains for plane stress condition analytically and graphically for structural members and analyze stress distribution for thick and thin cylinders.					
C202.5							
DEPARTMENT	ME	SEMESTER	3	COURSE CODE	18ME33	COURSE ID	C203
COURSE TITLE		Basic Thermodynamics					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C203.1		Able to learn about the fundamentals of energy interactions, laws of thermodynamics along with various processes involved and properties.					
C203.2		Able to understand and obtain the relationship between different temperature scale, energy and its property.					
C203.3		Able to apply conservation of energy, the laws of thermodynamics in various systems.					
C203.4							
C203.5							
DEPARTMENT	ME	SEMESTER	3	COURSE CODE	18ME34	COURSE ID	C204
COURSE TITLE		Material Science					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					

C204.1	Able to understand the properties of engineering materials and their behavior						
C204.2	Able to describe the procedure of heat treatment and processing of composite materials						
C204.3	Able to understand the potentialities of various materials and material selection procedure						
C204.4							
C204.5							
DEPARTMENT	ME	SEMESTER	3	COURSE CODE	18ME35A	COURSE ID	C205
COURSE TITLE	Metal cutting and forming						
COURSE OUTCOME NO	COURSE OUTCOME STATEMENTS						
C205.1	Describe various cutting tool materials, machine tools, machining processes and metal forming processes						
C205.2	Explain the mechanism of machining processes, cutting tool materials, tool nomenclature, tool wear, tool life and economics of machining processes and metal forming processes.						
C205.3	Estimate the effect of machining processes and parameters on surface finish, tool wear, tool life, machining efficiency and to estimate the effect of different forces acting on the dies during sheet metal operations.						
C205.4							
C205.5							
DEPARTMENT	ME	SEMESTER	3	COURSE CODE	18ME36A	COURSE ID	C206
COURSE TITLE	COMPUTER AIDED MACHINE DRAWING						
COURSE OUTCOME NO	COURSE OUTCOME STATEMENTS						
C206.1	Able to draw orthographic projections and sectional views of standard primitives and Machine components.						
C206.2	Able to draw orthographic projections of standard thread forms, joints and couplings.						
C206.3	Able to create/model parts and assembly of machine components using Solid edge.						
C206.4							
C206.5							
DEPARTMENT	ME	SEMESTER	3	COURSE CODE	18MEL37A	COURSE ID	C207
COURSE TITLE	MATERIAL TESTING LAB						

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COURSE OUTCOME NO	COURSE OUTCOME STATEMENTS
C207.1	Able to gain knowledge to conduct material tests to find different material properties. Also to gain knowledge about the heat treatment processes and non-destructive tests.
C207.2	Able to understand and demonstrate different microstructures of the material.
C207.3	Able to implement different strength and characteristic tests of a material depending on the application.
C207.4	
C207.5	

DEPARTMENT	ME	SEMESTER	3	COURSE CODE	18MEL38A	COURSE ID	C208
COURSE TITLE	Workshop and Machine Shop Practice						

COURSE OUTCOME NO	COURSE OUTCOME STATEMENTS
C208.1	Able to describe various machine tools, machining processes, mechanics of machining and cutting tool materials.
C208.2	Able to explain the mechanism of machining processes, cutting tool materials, tool nomenclature, tool wear, tool life and economics of machining processes
C208.3	Able to estimate the effect of machining processes and parameters on surface finish, tool wear, tool life and machining efficiency.
C208.4	
C208.5	

DEPARTMENT	ME	SEMESTER	4	COURSE CODE	18ME42	COURSE ID	C212
COURSE TITLE	Applied Thermodynamics						

COURSE OUTCOME NO	COURSE OUTCOME STATEMENTS
C212.1	Able to outline the Gas power cycles, vapour power cycles and know how fuel burns and their thermodynamic properties.
C212.2	Able to explain the performance and mechanisms of gas power cycle, steam power cycle and refrigeration system

C212.3		Able to compute the performance of gas power plant, steam power plant, IC Engine, Reciprocating compressors and refrigeration system.					
C212.4							
C212.5							
DEPARTMENT	**ME**	**SEMESTER**	**4**	**COURSE CODE**	**18ME43**	**COURSE ID**	**C213**
COURSE TITLE		**Fluid Mechanics**					
COURSE OUTCOME NO		**COURSE OUTCOME STATEMENTS**					
C213.1		Able to understand the basics of fluid properties, statics, dynamics, kinematics, concept of boundary layer in fluid flow as well as CFD					
C213.2		Able to explain the principle of buoyancy and flotation, laminar and turbulent flow, flow across body and checking dimensional homogeneity					
C213.3		Able to calculate the key fluid properties, meta centric height, lift, drag and applying Bernoulli's equation to devices					
C213.4							
C213.5							
DEPARTMENT	**ME**	**SEMESTER**	**4**	**COURSE CODE**	**18ME44**	**COURSE ID**	**C214**
COURSE TITLE		**Kinematics of Machines**					
COURSE OUTCOME NO		**COURSE OUTCOME STATEMENTS**					
C214.1		Able to illustrate the terminology of mechanisms					
C214.2		Able to identify the degrees of freedom and motion characteristics of planar mechanisms.					
C214.3		Able to predict the motion of planar mechanisms graphically and mathematically.					
C214.4		Able to describe the characteristics of motion in gears with involute profile					
C214.5		Able to calculate the velocity ratio or number of teeth for an epicyclic gear train drive.					
C214.6		Able to draw the profile of the cam for a desired follower motion.					
DEPARTMENT	**ME**	**SEMESTER**	**4**	**COURSE CODE**	**18ME45**	**COURSE ID**	**C215**
COURSE TITLE		**Metal Casting and Welding**					
COURSE OUTCOME NO		**COURSE OUTCOME STATEMENTS**					

C215.1	Able to gain Knowledge about casting, welding, soldering brazing process and solidification						
C215.2	Able to describe molds, castings, welding, solidification process, inspection methods and furnaces. Also describe soldering, brazing methodologies.						
C215.3	Able to apply different casting, joining and inspection methods depending on requirement.						
C215.4							
C215.5							
DEPARTMENT	**ME**	**SEMESTER**	**4**	**COURSE CODE**	**18ME46B**	**COURSE ID**	**C216**
COURSE TITLE	**Mechanical Measurements and Metrology**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C216.1	Define terms associated to metrology, measurements, measuring equipment's.						
C216.2	Explain different measuring instruments and their utilization.						
C216.3	Illustrate the measurement of force, torque, pressure, strain, temperature , screw and gear profile.						
C216.4							
C216.5							
DEPARTMENT	**ME**	**SEMESTER**	**4**	**COURSE CODE**	**18MEL47B**	**COURSE ID**	**C217**
COURSE TITLE	**Mechanical Measurements and Metrology Lab**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C217.1	Able to gain knowledge on how to use different metrology measuring instruments						
C217.2	Able to understand and demonstrate different measuring instruments						
C217.3	Able to illustrate the measurement of force, torque, pressure, strain, temperature, screw and gear profile etc.,						
C217.4							
C217.5							
DEPARTMENT	**ME**	**SEMESTER**	**4**	**COURSE CODE**	**18MEL48A**	**COURSE ID**	**C218**
COURSE TITLE	**Foundry and Forging Lab**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						

C218.1	Able to have the Knowledge on the preparation of foundry sand and its testing, understanding on basic foundry and forging operations along with the tools involved in each of the process
C218.2	Able to describe different parameters involved in sand moulding, identify the importance of sand testing and its effects on the final quality of the mould.
C218.3	Able to perform basic foundry and forging operations to obtain the desired shapes and with the prescribed quality.
C218.4	Able to compare and Analyse the effect of sand and its composition on the strength of the mould using various testing procedures.
C218.5	

3RD YEAR

DEPARTMENT	**ME**	**SEMESTER**	**5**	**COURSE CODE**	**17ME51**	**COURSE ID**	**C301**
COURSE TITLE		**MANAGEMENT AND ENGINEERING ECONOMICS**					
COURSE OUTCOME NO		**COURSE OUTCOME STATEMENTS**					
C301.1		Understand needs, functions, roles, scope and evolution of Management; Importance, purpose of Planning and hierarchy of planning and also analyze its types.					
C301.2		Understanding of why economics Is important to engineers, basic interest calculations.					
C301.3		Discuss Decision making, Organizing, Staffing, Directing and Controlling					
C301.4		How to arrive at the Selling Price of a component, cost components involved in manufacturing product.					
C301.5		To evaluate assests/ projects and choose alternatives based on the investment today					
DEPARTMENT	**ME**	**SEMESTER**	**5**	**COURSE CODE**	**17ME52**	**COURSE ID**	**C302**
COURSE TITLE		**DYNAMICS OF MACHINERY**					
COURSE OUTCOME NO		**COURSE OUTCOME STATEMENTS**					
C302.1		Describe motion, static and dynamic equilibrium conditions for different mechanisms and machine elements.					
C302.2		Understand force transmission and balancing in different mechanisms and also principles of vibrations of single degree of freedom mechanical systems					
C302.3		Solve problems on force transmission and balancing in different mechanisms and vibration characteristics of single					

	degree of freedom mechanical systems.						
C302.4	Explain force transmission and vibration characteristics in different mechanical systems.						
C302.5							
DEPARTMENT	**ME**	**SEMESTER**	**5**	**COURSE CODE**	**17ME53**	**COURSE ID**	**C303**
COURSE TITLE	**TURBO MACHINES**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C303.1	Able to define basic definitions of turbomachines and sketching of velocity triangles for different flow turbomachines.						
C303.2	Able to derive or Obtain expressions for different flow type turbomachines during energy transfer.						
C303.3	Able to apply the derived equations and knowledge of turbomachines in solving numerical problems						
C303.4							
C303.5							
DEPARTMENT	**ME**	**SEMESTER**	**5**	**COURSE CODE**	**17ME54**	**COURSE ID**	**C304**
COURSE TITLE	**DESIGN OF MACHINE ELEMENTS-**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C304.1	Understand basic of Mechanical Design procedure, material properties and selection of material, codes and standards.						
C304.2	Design machine components for static, impact and fatigue strength.						
C304.3	Design fasteners, shafts, keys, couplings, riveted and welded joints,						
C304.4	Analyze the stress level and deformation in the different parts of the machine components, to determine the dimensions of the component.						
C304.5							
DEPARTMENT	**ME**	**SEMESTER**	**5**	**COURSE CODE**	**17ME554**	**COURSE ID**	**C305**
COURSE TITLE	**NON TRADITIONAL MACHINING**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C305.1	To understand the importance and different types of non-traditional machining methods.						
C305.2	Able to explain principle and procedure of various NTM processes						
C305.3	Illustrate the process parameters, limitations, advantages and applications of different NTM processes.						
C305.4							
C305.5							

DEPARTMENT	ME	SEMESTER	5	COURSE CODE	17ME563	COURSE ID	C306
COURSE TITLE		AUTOMATION AND ROBOTICS					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C306.1		To identify potential areas for automation and justify need for automation.					
C306.2		To select suitable major control components required to automate a process or an activity.					
C306.3		To study the various parts of robots and fields of robotics.					
C306.4		To study the various kinematics and inverse kinematics of robots.					
C306.5		To study the control of robots for some specific applications.					
DEPARTMENT	ME	SEMESTER	5	COURSE CODE	17MEL57	COURSE ID	C307
COURSE TITLE		FLUID MECHANICS AND MACHINERY LAB					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C307.1		Able to define fluid mechanics, fluid and their properties					
C307.2		Able to obtain or derive mathematical relation and conduct the experiment					
C307.3		Able to calculate the efficiency and discharge by the machineries					
C307.4							
C307.5							
DEPARTMENT	ME	SEMESTER	5	COURSE CODE	17MEL58	COURSE ID	C308
COURSE TITLE		ENERGY LAB					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C308.1		Able to define basic terms and performance parameters of IC engines					
C308.2		Able to write the Procedure of working of various IC engine equipments and measuring apparatus					
C308.3		Able to calculate the performance parameters of IC engines, properties of fuel and lubricating oils					
C308.4							
C308.5							

DEPARTMENT	ME	SEMESTER	6	COURSE CODE	17ME61	COURSE ID	C311
COURSE TITLE		Finite Element Analysis					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C311.1		Able to know the principles of energy methods, stress					

	conditions and finite element method.						
C311.2	Able to Derive shape functions & stiffness matrices for different finite elements.						
C311.3	Able to obtain Stiffness matrix and Load vector of bar, Truss, Beams, Conduction elements						
C311.4	Able to solve problems on Bar, Truss, Beams, Heat Transfer, Numerical Integration						
C311.5							
DEPARTMENT	**ME**	**SEMESTER**	**6**	**COURSE CODE**	**17ME62**	**COURSE ID**	**C312**
COURSE TITLE	**Computer integrated Manufacturing**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C312.1	Able to define Automation, CIM, CAD, CAM, CNC, CNC program, Robotic systems, Additive manufacturing, Industry 4.0 and IOT.						
C312.2	Able to explain the basics of automated manufacturing industries through mathematical models and categorize different types of automated flow lines, robotic systems, additive manufacturing techniques.						
C312.3	Able to execute programs for various manufacturing processes and robot programming.						
C312.4	Able to analyze the automated flow lines to reduce time and enhance productivity						
C312.5	Able to visualize and appreciate the modern trends in Manufacturing like additive manufacturing, Industry 4.0 and applications of Internet of Things leading to Smart Manufacturing.						
DEPARTMENT	**ME**	**SEMESTER**	**6**	**COURSE CODE**	**17ME63**	**COURSE ID**	**C313**
COURSE TITLE	**Heat Transfer**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C313.1	Able to state the different modes of Heat Transfer						
C313.2	Able to derive the laws from the modes in Heat Transfer						
C313.3	Able to draw/ Apply the heat flow rate and effectiveness of conduction, convection and radiation heat transfer						
C313.4							
C313.5							
DEPARTMENT	**ME**	**SEMESTER**	**6**	**COURSE CODE**	**17ME64**	**COURSE ID**	**C314**
COURSE TITLE	**Design of Machine Elements -II**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C314.1	Able to define stresses in curved beams and springs						
C314.2	Able to select the flexible (belt, rope and chain) drives and gears.						
C314.3	Able to explain the stresses in curved beams, springs, power						

	transmitting elements and IC engine parts.						
C314.4	Able to determine the stresses in curved beams, springs and gears.						
C314.5	Able to calculate the flexible drive sizes, breaks, clutch, bearings and IC engine parts						
DEPARTMENT	**ME**	**SEMESTER**	**6**	**COURSE CODE**	**17ME655**	**COURSE ID**	**C315**
COURSE TITLE	**Automobile Engineering**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C315.1	Identifying different parts of an automobile and it's working						
C315.2	Understand the working of transmission and braking systems						
C315.3	Comprehend the working of steering and suspension systems						
C315.4	Learn various types of fuels and injection systems						
C315.5	Know the cause of automobile emissions, its effects on environment and methods to reduce the emissions.						
DEPARTMENT	**ME**	**SEMESTER**	**6**	**COURSE CODE**	**17ME664**	**COURSE ID**	**C316**
COURSE TITLE	**Total Quality Management**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C316.1	Able to identify and demonstrate the principles of TQM, Quality Gurus, Leadership and Customer Satisfaction.						
C316.2	Able to describe the tools used in Quality Management						
C316.3	Able to apply the concept of Six Sigma and Statistical Process Control. Construct the Control Charts, Interpret the type of data and evaluate.						
C316.4							
C316.5							
DEPARTMENT	**ME**	**SEMESTER**	**6**	**COURSE CODE**	**17MEL67**	**COURSE ID**	**C317**
COURSE TITLE	**Heat Transfer Lab**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C317.1	Able to define basic terms and modes of heat transfer						
C317.2	Able to write the Procedure of working of various heat transfer equipments as well as refrigeration and Air conditioning system.						
C317.3	Able to calculate the heat transfer rate, heat transfer coefficients and performance of RAC by conducting experiments, also temperature distribution of steady and transient heat conduction using numerical approach.						
C317.4							
C317.5							
DEPARTMENT	**ME**	**SEMESTER**	**6**	**COURSE CODE**	**17MEL68**	**COURSE ID**	**C318**

COURSE TITLE	Modelling and Analysis Lab
COURSE OUTCOME NO	COURSE OUTCOME STATEMENTS
C318.1	Able to finite Element Analysis & Applications
C318.2	Able to comprehend natural frequency, Damping of single degree of vibrating systems, critical speed of shafts, pressure distribution in journal bearing
C318.3	Able to calculate and interpret stress and strains using strain gauges, photo elastic compression and bending To orient and balance masses rotating in different planes.
C318.4	Able to analyse stress concentration in rectangular plate with hole and to analyse governor equilibrium speed, sensitivity and power.
C318.5	

4TH YEAR

DEPARTMENT	ME	SEMESTER	7	COURSE CODE	15ME71	COURSE ID	C401
COURSE TITLE		ENERGY ENGINEERING					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C401.1		Able to Enable to comprehend the knowledge of fundamentals.					
C401.2		Able to understand various parameters related to the power plants.					
C401.3		Able to understand the mathematical relationship with respect to Economic Analysis of power plants.					
C401.4							
C401.5							
DEPARTMENT	ME	SEMESTER	7	COURSE CODE	15ME72	COURSE ID	C402
COURSE TITLE		FLUID POWER SYSTEMS					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C402.1		Enables to understand the Principle and components of Hydraulic and Pneumatic system.					
C402.2		Enables to understand the working of Hydraulics pumps and motors, able to calculate performance of Pumps and motors.					
C402.3		Understand Hydraulic and Pneumatic control components and their graphic symbols.					
C402.4		Able to design Hydraulic/Pneumatic Circuits. Understand basic fluid power maintenance procedures.					
C402.5		Understand the usage of logic gates & multi cylinder applications.					

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DEPARTMENT	ME	SEMESTER	7	COURSE CODE	15ME73	COURSE ID	C403
COURSE TITLE		CONTROL ENGINEERING					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C403.1		Able to recognize control system and its types , control actions.					
C403.2		Able to determine the system governing equations for physical models (Electrical, Thermal, Mechanical, Electro Mechanical).					
C403.3		Able to calculate the gain of the system using block diagram and signal flow graph					
C403.4		Able to illustrate the response of 1st and 2nd order systems.					
C403.5		Able to determine the stability of transfer functions in complex domain and frequency domain.					
C403.6		Able to employ state equations to study the controllability and observability					
DEPARTMENT	ME	SEMESTER	7	COURSE CODE	15ME745	COURSE ID	C404
COURSE TITLE		SMART MATERIALS AND MEMS					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C404.1		Identify the smart structures, vibration absorbers and MEMS.					
C404.2		Summarize the properties of shape memory alloy, reheological fluids and optical fibers.					
C404.3		Describe the sensor and actuator devices and characterize the smart structure.					
C404.4		Carryout the case studies of MEMS for performance and reliability accounting					
C404.5							
DEPARTMENT	ME	SEMESTER	7	COURSE CODE	15ME751	COURSE ID	C405
COURSE TITLE		AUTOMOTIVE ELECTRONICS					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C405.1		Recall the basic concepts and electronic systems used in automobiles					
C405.2		Summarize different technological advances in automobiles including diagnostics of systems and sub systems.					
C405.3		Select sensors, actuators and control systems for different applications in automobiles					
C405.4							
C405.5							
DEPARTMENT	ME	SEMESTER	7	COURSE CODE	15MEL76	COURSE ID	C406
COURSE TITLE		DESIGN LAB					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					

C406.1	Able to identify the longitudinal and Torsional single degree of vibrating systems, also to identify different types of Governors, Gyroscope.
C406.2	Able to comprehend natural frequency, Damping of single degree of vibrating systems, critical speed of shafts, pressure distribution in journal bearing
C406.3	Able to calculate and interpret stress and strains using strain gauges, photo elastic compression and bending and to orient and balance masses rotating in different planes.
C406.4	Able to analyse stress concentration in rectangular plate with hole and to analyse governor equilibrium speed, sensitivity and power.
C406.5	

DEPARTMENT	ME	SEMESTER	7	COURSE CODE	15MEL77	COURSE ID	C407

COURSE TITLE	CIM LAB
COURSE OUTCOME NO	COURSE OUTCOME STATEMENTS
C407.1	Able to write CNC part programs using CADEM simulation package for simulation of machining operations such as Turning, Drilling & Milling.
C407.2	Able to understand write programs for Flexible Manufacturing Systems Robotics
C407.3	Able to understand the operating principles of hydraulics, pneumatics and electro– pneumatic systems.
C407.4	
C407.5	

DEPARTMENT	ME	SEMESTER	8	COURSE CODE	15ME81	COURSE ID	C411

COURSE TITLE	Operations Research
COURSE OUTCOME NO	COURSE OUTCOME STATEMENTS
C411.1	Able to define terminologies and procedures associated with different Operations Research techniques.
C411.2	Able to describe the importance, Characteristics and limitations of OR techniques
C411.3	Able to apply OR technique/strategies to solve industrial and managerial related problems.
C411.4	Able to allocate and schedule the resources and optimum cost and time.
C411.5	Able to review and evaluate project duration and Critical path.

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DEPARTMENT	ME	SEMESTER	8	COURSE CODE	15ME82	COURSE ID	C412
COURSE TITLE		Additive manufacturing					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C412.1		Understand the different process of Additive Manufacturing. using Polymer, Powder and Nano materials manufacturing.					
C412.2		Analyse the different characterization techniques					
C412.3		Describe the various NC, CNC machine programing and Automation techniques					
C412.4							
C412.5							
DEPARTMENT	ME	SEMESTER	8	COURSE CODE	15ME835	COURSE ID	C413
COURSE TITLE		PRODUCT LIFE CYCLE MANAGEMENT					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C413.1		Explain the various strategies involved in Product Life Cycle Management and Product Data Management					
C413.2		Carry out the decomposition and model simulation in product design					
C413.3		Implement structuring in new product development process.					
C413.4		Select the tools needed to forecast the technology innovation.					
C413.5		Carry out product structuring using virtual product development tools					

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2018-19

DEPARTMENT	ME	SEMESTER	1	COURSE CODE	18MDE12	COURSE ID	C102
COURSE TITLE		Advanced Theory of Vibrations					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C102.1		Apply Newton's equation of motion and energy methods to model basic vibrating mechanical system, model undamped and damped mechanical systems and structures for free and harmonically forced vibrations.					
C102.2		Model single-and multi-degree of freedom for free and forced vibrations and determine response to vibration, natural frequencies and modes of vibration.					
C102.3		Apply the fundamentals of vibration to its measurement and analysis.					
C102.4		Solve realistic vibration problems in mechanical engineering design that involves application of most of the course syllabus					
C102.5							

DEPARTMENT	ME	SEMESTER	1	COURSE CODE	18MDE13	COURSE ID	C103
COURSE TITLE		Continuum mechanics					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C103.1		Treat general stresses and deformations in continuous materials.					
C103.2		Formulate and solve specific technical problems of displacement, strain and stress.					
C103.3		Perform experiments with stresses and deformations.					
C103.4		Model and analyse the stresses and deformations of simple geometries under an arbitrary load in solids					
C103.5							

DEPARTMENT	ME	SEMESTER	1	COURSE CODE	18MDE14	COURSE ID	C104
COURSE TITLE		Dynamics and Mechanism Designs					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C104.1		Apply the tools of analytical dynamics with the main goal of developing mathematical models that describe the dynamics of systems of rigid bodies.					
C104.2		Formulate equations of motion for complicated mechanical systems /linkages and hods for solving these equations.					
C104.3		Understand multi body dynamics in mechanical engineering design.					
C104.4							

C104.5							
DEPARTMENT	**ME**	**SEMESTER**	**1**	**COURSE CODE**	**18MDE15**	**COURSE ID**	**C105**
COURSE TITLE		**Fracture Mechanics**					
COURSE OUTCOME NO		**COURSE OUTCOME STATEMENTS**					
C105.1		Develop basic fundamental understanding of the effects of crack like defects on the performance of aerospace, civil, and mechanical engineering structures.					
C105.2		Select appropriate materials for engineering structures to ensure damage tolerance by knowing the critical values of parameters at crack tip.					
C105.3		Establishing relationship between crack tip opening displacement, SIF and determining critical crack sizes through numerical methods.					
C105.4		Employing suitable testing methods to determine fatigue crack propagation rates in engineering structures.					
C105.5							
DEPARTMENT	**ME**	**SEMESTER**	**1**	**COURSE CODE**	**18MDEL16**	**COURSE ID**	**C106**
COURSE TITLE		**Design laboratory -1**					
COURSE OUTCOME NO		**COURSE OUTCOME STATEMENTS**					
C106.1		Able to state effect of load on different structural members					
C106.2		Able to develop numerical programs for analysis using MAT Lab					
C106.3		Able to analyze structural systems subjected loads and displacements using FEA software					
C106.4							
C106.5							
DEPARTMENT	**ME**	**SEMESTER**	**1**	**COURSE CODE**	**18RMI17**	**COURSE ID**	**C107**
COURSE TITLE		**Research Methodology and IPR**					
COURSE OUTCOME NO		**COURSE OUTCOME STATEMENTS**					
C107.1		Discuss research methodology and the technique of defining a research problem.					
C107.2		Explain the functions of the literature review in research, carrying out a literature search, developing theoretical and Conceptual frameworks and writing a review.					
C107.3		Explain various research designs and their characteristics.					
C107.4		Explain the art of interpretation and the art of writing research reports.					
C107.5							

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DEPARTMENT	ME	SEMESTER	2	COURSE CODE	18MEA21	COURSE ID	C111
COURSE TITLE		Finite Element Methods					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C111.1		Know the principles of energy methods, stress conditions and finite element method.					
C111.2		Derive shape functions & stiffness matrices for different finite elements.					
C111.3		Obtain Stiffness matrix and Load vector of bar, Truss, Beams, frames and plates.					
C111.4		solve problems on Bar, Truss, Beams, frames, plates, Numerical Integration					
C111.5							
DEPARTMENT	ME	SEMESTER	2	COURSE CODE	18MDE22	COURSE ID	C112
COURSE TITLE		Advanced Machine Design					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C112.1		Able to understand the concepts of failure theories for ductile and brittle materials, fatigue design and testing, crack nucleation and growth, surface failure mechanisms					
C112.2		Apply the stress and strain life approach to design the machine components with Variable Amplitude Loading					
C112.3		Analyze the design of machine components based on fatigue, crack, stress and strain life approach with Variable Amplitude Loading					
C112.4							
C112.5							
DEPARTMENT	ME	SEMESTER	2	COURSE CODE	18MDE23	COURSE ID	C113
COURSE TITLE		Tribology and Bearing Design					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C113.1		Understand the principles of viscosity, lubrication, friction and wear.					
C113.2		Acquire a comprehensive knowledge of hydrostatic and hydrodynamic bearings on working, load carrying, friction and power loss.					

C113.3	Interpret the lubrication significance and advantages of antifriction, porous and magnetic bearings use practical applications.						
C113.4	Determine pressure distribution, load carrying capacity, frictional force power loss in different bearings.						
C113.5							
DEPARTMENT	**ME**	**SEMESTER**	**2**	**COURSE CODE**	**18MEA242**	**COURSE ID**	**C114**
COURSE TITLE	**Computer application in design**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C114.1	Able to understand the concepts and tools of computer applications as used in the engineering profession.						
C114.2	Able to learn the principles of CAD/CAM/CAE Systems, Graphics programming, Geometric Modeling Systems, CAD, CAM and CAE Integration, and standards for Communicating between Systems.						
C114.3	To learn to create technically correct surface and solid models that are common to and useful for visualization.						
C114.4							
C114.5							
DEPARTMENT	**ME**	**SEMESTER**	**2**	**COURSE CODE**	**18MEA252**	**COURSE ID**	**C115**
COURSE TITLE	**Automobile System Design**						
COURSE OUTCOME NO	**COURSE OUTCOME STATEMENTS**						
C115.1	Gain an insight into aspects of vehicle design, operation and maintenance, which will be useful for taking up a position in the automotive industry						
C115.2	Apply the knowledge in creating a preliminary design of automobile sub systems.						
C115.3	Identify construction, working, preventive maintenance, troubleshooting diagnosis of various Automobile Systems.						
C115.4	Identify Modern technology and safety measures used in Automotive Vehicles.						
C115.5							

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DEPARTMENT	ME	SEMESTER	4	COURSE CODE	17MDE41	COURSE ID	C211
COURSE TITLE		Tribology and Bearing Design					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C115.1		Understand the principles of viscosity, lubrication, friction and wear.					
C115.2		Acquire a comprehensive knowledge of hydrostatic and hydrodynamic bearings on working, load carrying, friction and power loss.					
C115.3		Interpret the lubrication significance and advantages of antifriction, porous and magnetic bearings use practical applications.					
C115.4		Determine pressure distribution, load carrying capacity, frictional force power loss in different bearings.					
C115.5							

DEPARTMENT	ME	SEMESTER	4	COURSE CODE	17CAE421	COURSE ID	C212
COURSE TITLE		Fracture Mechanics					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C115.1		Develop basic fundamental understanding of the effects of crack like defects on the performance of aerospace, civil, and mechanical engineering structures.					
C115.2		Select appropriate materials for engineering structures to ensure damage tolerance by knowing the critical values of parameters at crack tip.					
C115.3		Establishing relationship between crack tip opening displacement, SIF and determining critical crack sizes through numerical methods.					
C115.4		Employing suitable testing methods to determine fatigue crack propagation rates in engineering structures.					
C115.5							

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DEPARTMENT	ME	SEMESTER	1	COURSE CODE	18MDE12	COURSE ID	C102
COURSE TITLE		Advanced Theory of Vibrations					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C102.1		Apply Newton's equation of motion and energy methods to model basic vibrating mechanical system, model undamped and damped mechanical systems and structures for free and harmonically forced vibrations.					
C102.2		Model single-and multi-degree of freedom for free and forced vibrations and determine response to vibration, natural frequencies and modes of vibration.					
C102.3		Apply the fundamentals of vibration to its measurement and analysis.					
C102.4		Solve realistic vibration problems in mechanical engineering design that involves application of most of the course syllabus					
C102.5							
DEPARTMENT	ME	SEMESTER	1	COURSE CODE	18MDE13	COURSE ID	C103
COURSE TITLE		Continuum mechanics					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C103.1		Treat general stresses and deformations in continuous materials.					
C103.2		Formulate and solve specific technical problems of displacement, strain and stress.					
C103.3		Perform experiments with stresses and deformations.					
C103.4		Model and analyse the stresses and deformations of simple geometries under an arbitrary load in solids					
C103.5							
DEPARTMENT	ME	SEMESTER	1	COURSE CODE	18MDE14	COURSE ID	C104
COURSE TITLE		Dynamics and Mechanism Designs					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C104.1		Apply the tools of analytical dynamics with the main goal of developing mathematical models that describe the dynamics of systems of rigid bodies.					
C104.2		Formulate equations of motion for complicated mechanical systems /linkages and hods for solving these equations.					
C104.3		Understand multi body dynamics in mechanical engineering design.					

C104.4							
C104.5							
DEPARTMENT	**ME**	**SEMESTER**	**1**	**COURSE CODE**	**18MDE15**	**COURSE ID**	**C105**
COURSE TITLE		**Fracture Mechanics**					
COURSE OUTCOME NO		**COURSE OUTCOME STATEMENTS**					
C105.1		Develop basic fundamental understanding of the effects of crack like defects on the performance of aerospace, civil, and mechanical engineering structures.					
C105.2		Select appropriate materials for engineering structures to ensure damage tolerance by knowing the critical values of parameters at crack tip.					
C105.3		Establishing relationship between crack tip opening displacement, SIF and determining critical crack sizes through numerical methods.					
C105.4		Employing suitable testing methods to determine fatigue crack propagation rates in engineering structures.					
C105.5							
DEPARTMENT	**ME**	**SEMESTER**	**1**	**COURSE CODE**	**18MDEL16**	**COURSE ID**	**C106**
COURSE TITLE		**Design laboratory -1**					
COURSE OUTCOME NO		**COURSE OUTCOME STATEMENTS**					
C106.1		Able to state effect of load on different structural members					
C106.2		Able to develop numerical programs for analysis using MAT Lab					
C106.3		Able to analyze structural systems subjected loads and displacements using FEA software					
C106.4							
C106.5							
DEPARTMENT	**ME**	**SEMESTER**	**1**	**COURSE CODE**	**18RMI17**	**COURSE ID**	**C107**
COURSE TITLE		**Research Methodology and IPR**					
COURSE OUTCOME NO		**COURSE OUTCOME STATEMENTS**					
C107.1		Discuss research methodology and the technique of defining a research problem.					
C107.2		Explain the functions of the literature review in research, carrying out a literature search, developing theoretical and Conceptual frameworks and writing a review.					
C107.3		Explain various research designs and their characteristics.					
C107.4		Explain the art of interpretation and the art of writing research reports.					
C107.5							

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DEPARTMENT	ME	SEMESTER	2	COURSE CODE	18MEA21	COURSE ID	C111
COURSE TITLE		Finite Element Methods					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C111.1		Know the principles of energy methods, stress conditions and finite element method.					
C111.2		Derive shape functions & stiffness matrices for different finite elements.					
C111.3		Obtain Stiffness matrix and Load vector of bar, Truss, Beams, frames and plates.					
C111.4		solve problems on Bar, Truss, Beams, frames, plates, Numerical Integration					
C111.5							
DEPARTMENT	ME	SEMESTER	2	COURSE CODE	18MDE22	COURSE ID	C112
COURSE TITLE		Advanced Machine Design					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C112.1		Able to understand the concepts of failure theories for ductile and brittle materials, fatigue design and testing, crack nucleation and growth, surface failure mechanisms					
C112.2		Apply the stress and strain life approach to design the machine components with Variable Amplitude Loading					
C112.3		Analyze the design of machine components based on fatigue, crack, stress and strain life approach with Variable Amplitude Loading					
C112.4							
C112.5							
DEPARTMENT	ME	SEMESTER	2	COURSE CODE	18MDE23	COURSE ID	C113
COURSE TITLE		Tribology and Bearing Design					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C113.1		Understand the principles of viscosity, lubrication, friction and wear.					
C113.2		Acquire a comprehensive knowledge of hydrostatic and hydrodynamic bearings on working, load carrying, friction and power loss.					
C113.3		Interpret the lubrication significance and advantages of antifriction, porous and magnetic bearings use practical applications.					
C113.4		Determine pressure distribution, load carrying capacity,					

	frictional force power loss in different bearings.						
C113.5							
DEPARTMENT	ME	SEMESTER	2	COURSE CODE	18MEA242	COURSE ID	C114
COURSE TITLE	Computer Application in Design						
COURSE OUTCOME NO	COURSE OUTCOME STATEMENTS						
C114.1	Able to understand the concepts and tools of computer applications as used in the engineering profession.						
C114.2	Able to learn the principles of CAD/CAM/CAE Systems, Graphics programming, Geometric Modeling Systems, CAD, CAM and CAE Integration, and standards for Communicating between Systems.						
C114.3	To learn to create technically correct surface and solid models that are common to and useful for visualization.						
C114.4							
C114.5							
DEPARTMENT	ME	SEMESTER	2	COURSE CODE	18MEA252	COURSE ID	C115
COURSE TITLE	Automobile System Design						
COURSE OUTCOME NO	COURSE OUTCOME STATEMENTS						
C115.1	Gain an insight into aspects of vehicle design, operation and maintenance, which will be useful for taking up a position in the automotive industry						
C115.2	Apply the knowledge in creating a preliminary design of automobile sub systems.						
C115.3	Identify construction, working, preventive maintenance, troubleshooting diagnosis of various Automobile Systems.						
C115.4	Identify Modern technology and safety measures used in Automotive Vehicles.						
C115.5							
DEPARTMENT	ME	SEMESTER	1	COURSE CODE	18MDEL26	COURSE ID	C106
COURSE TITLE	Design laboratory -II						
COURSE OUTCOME NO	COURSE OUTCOME STATEMENTS						
C106.1	Able to state and explain thermal, structural and fluid forces on structural members						
C106.2	Able to develop fine element model using for different structural and fluid systems						
C106.3	Able to analyze structural, fluid systems for loads and displacements using FEA software						
C106.4	Able to investigate using structural, fluid systems responses for various load conditions						
C106.5							

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DEPARTMENT	ME	SEMESTER	2	COURSE CODE	18MDE31	COURSE ID	C201
COURSE TITLE		Design for Manufacture and Assembly					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C201.1		Describe the different types of manufacturing systems and compare their suitability for economic production of various components and products.					
C201.2		Identify factors and causing mechanisms of the defects likely to occur with different manufacturing processes in producing mechanical products and the relevant design approaches to rectify them.					
C201.3		Select proper materials and manufacturing processes for designing products/components by applying the relevant principles for ease and economic production.					
C201.4							
C201.5							
DEPARTMENT	ME	SEMESTER	2	COURSE CODE	18CAE321	COURSE ID	C202
COURSE TITLE		Experimental Mechanics					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C202.1		Able to understand different techniques of finding structural stress and strains					
C202.2		Able to develop mathematical relationships for calculation of stress and strain in different techniques like strain gauges, photoelasticity, and brittle coating, Moiré-fringes					
C202.3		Apply the principles and techniques of brittle coating analysis and holographic analysis					
C202.4							
C202.5							
DEPARTMENT	ME	SEMESTER	2	COURSE CODE	18MDE332	COURSE ID	C203
COURSE TITLE		Composite Materials Technology					
COURSE OUTCOME NO		COURSE OUTCOME STATEMENTS					
C203.1		Understand the Composites materials. Manufacturing process. And it's NDT Tests.					
C203.2		Outline the stress-strain relations for Composites materials					
C203.3		Determine the composite structures for space, aerospace, automobile, marine, electrical & electronics, and sports& recreational. And its applications.					

C203.4	
C203.5	