

Mechanical Engineering:III Semester		
S.No.	Course Code	Course Outcome
1.	AHT-006	<ol style="list-style-type: none"> 1. Apply the concept Laplace transformation in solving real life problems. 2. Apply the concept Fourier transformation to evaluate engineering problems. 3. Evaluate the roots of algebraic and transcendental equations. 4. Solve the problems related to interpolation, differentiation and integration and the solution of differential equation. 5. Apply the concept of correlation, regression, moments, skewness and kurtosis and curvefitting in solving computer sciences and engineering problems.
2.	AHT-007	<ol style="list-style-type: none"> 1. Examine the nature and objective of technical communication relevant for the work place 2. Evaluate efficiency as fluent communicators by learning voice dynamics using various phonetics. 3. Analyse inputs by presentations skills to Enhance confidence in face of diverse audience in personality development 4. Utilize the technical writing for the exposure of dimensions (public speaking, presentations, group discussion) of technical communication. 5. Assess skills to promote technical competences/adhere to ethical standards in technical communication, including proper citation and plagiarism.
3.	AHT-008	<ol style="list-style-type: none"> 1. Apply the significance of Universal Human Values in various aspects of life and society 2. Examine the innate desires and goals common to all people while considering the societal, environment and economic context. 3. Determine the strategies to promote and integrate Universal Human Values in Personal and professional life 4. Analyze harmony in nature and existence, and work out their mutually fulfilling participation in the nature. 1. Write a comprehensive report on implication of adopting a holistic view on ethical human conduct
4.	MET-002	<ol style="list-style-type: none"> 1. Apply the basic concepts, Zeroth and First Laws of Thermodynamics, and their analysis over control mass and control volume systems. 2. Describe Second Law of Thermodynamics and its corollaries along with estimation of change of entropy and availability during for various thermodynamic processes. 3. Estimate various thermodynamic properties of pure substance,

		<p>ideal gas and mixture of ideal gases with the help of established thermodynamic relations, Mollier Chart and Steam Tables.</p> <ol style="list-style-type: none"> Derive various thermodynamic relations such as Joule-Thomson, Clausius Clapeyron, etc., and performance parameters of various gas power cycles. Analyze various Vapour power cycles and effect of operating parameters on their performance.
5.	MET-003	<ol style="list-style-type: none"> Apply the knowledge of crystallography and analyzing the deformation behavior of crystalline solids. Predict phase evaluation and phase stability in binary system due to phase transformation under equilibrium condition Examine the effect of alloying elements on structure and properties of ferrous, nonferrous alloys and designate the steel as per BIS standard. Design the heat treatment process to derive desired mechanical properties of Iron-Carbon alloys Assess the properties and applications of non metallic materials viz. ceramics, polymers, Nano-materials and composites. Evaluate the mechanical properties of different materials through employment of various experimental techniques.
6.	MET-004	<ol style="list-style-type: none"> Explain the fluid and Fluid properties, Buoyancy, stability of submerged and floating bodies, Manometry, and static fluid forces on different surfaces Compare various types of flow, Mass Momentum and energy conservation and related equations. Evaluate laminar and turbulent flow through pipes and parallel plates. Explain various applications of Bernoulli's Equation, Notches and Weirs, Orifices and Mouthpieces, Major and Minor losses in pipe flow, piping network, and draw HGL and TEL Classify different Turbines and Pumps, plot curves for various efficiencies and draw velocity triangles for the same.
7.	MEP-004	<ol style="list-style-type: none"> Identify the various crystal lattice and prepare the specimen for metallographic examination. Describe the working of Universal Testing Machine (UTM) and Evaluate Mechanical Properties of given specimen under Tensile, Compressive, Shear and Bending loading condition. Describe the working of Torsion testing machine and determine experimentally the twisting moment and modulus of rigidity of specimen using torsion testing machine. Explain hardness of materials, Brinell, Rockwell and Vickers hardness number. Describe the working of Brinell and Rockwell hardness testing machine, perform hardness test and determine the Brinell and Rockwell hardness number of given

		<p>specimen.</p> <p>5. Describe the working of Impact testing machine. Differentiate between Izod and Charpy tests. Experimentally determine resilience of given materials by impact test.</p>
8.	MEP-005	<ol style="list-style-type: none"> 1. Determine experimentally Metacentric height of the given body; and Cd, Cv & Cc of the given orifice. 2. Calibrate experimentally the given rectangular notch or triangular notch, Venturimeter, Nozzle meter and Orifice meter and determine flow rate. 3. Stating Bernoulli's theorem with assumptions verify experimentally Bernoulli's theorem with the help of given experimental setup. 4. Determine and analyze major and minor pipe losses. 5. Explain and compare the working of various turbines, pipe fittings and manometers.
9.	MEP-006	<ol style="list-style-type: none"> 1. Identify and explain various engineering scales and curves. 2. Apply basics of CAD/CAM and explain orthographic projection of points, lines, and planes. 3. Demonstrate and explain projections of solids. 4. Draw and explain section of solids. 5. Explain various commands and create drawing in AutoCAD.
10.	MEP-007	<ol style="list-style-type: none"> 1. Apply knowledge to solve engineering problem in multidisciplinary functional teams to communicate effectively and ethically. 2. Review the problem and literature to identify the gaps, objectives & scope of the work in project team in advanced areas of mechanical engineering. 3. Analyze the problems of mechanical engineering to formulate objectives of project. 4. Design a system, component, or process to meet the desired needs within certain realistic constraints such as economic, environmental, social, safety, manufacturability, and sustainability. 5. Demonstrate the techniques, skills, and modern engineering tools necessary for engineering practice. 6. Prepare a professional report as per recommended format and defend the work.
11.	CST-005	<ol style="list-style-type: none"> 1. Apply object-oriented concept to solve real world problem. 2. Illustrate the process of structuring the data using lists, tuples, and dictionaries.. 3. Design a built-in functions and operations to navigate the file system. 4. Investigate open source python modules Numpy,Pandas, Matplot lib, Flask submit report.

		<ol style="list-style-type: none"> 1. Design Data Analytics projects as a team using modern tools and techniques for multidisciplinary environment.
Mechanical Engineering:IV Semester		
12.	CST-006	<ol style="list-style-type: none"> 1. Identify and apply the provisions of the IT Act.2008 for conducting investigation in cyber crime. 2. Apply cyber laws to protect Internet community from cyber attacks and help professionals to commit ethics and their responsibilities. 3. Analyse the performance of cyber security system using modern engineering and IT tools. 4. Analyse preventive techniques against the attacks using modern techniques and IT Tools. 5. Evaluate different types of cyber threats and vulnerabilities in various computing systems.
13.	AHT-007	<ol style="list-style-type: none"> 1. Examine the nature and objective of technical communication relevant for the work place 2. Evaluate efficiency as fluent communicators by learning voice dynamics using various phonetics. 3. Analyse inputs by presentations skills to Enhance confidence in face of diverse audience in personality development 4. Utilize the technical writing for the exposure of dimensions (public speaking, presentations, group discussion)of technical communication. <p>Assess skills to promote technical competences/adhere to ethical standards in technical communication, including proper citation and plagiarism.</p>
14.	AHT-008	<ol style="list-style-type: none"> 1. Apply the significance of Universal Human Values in various aspects of life and society 2. Examine the innate desires and goals common to all people while considering the societal , environment and economic context. 3. Determine the strategies to promote and integrate Universal Human Values in Personal and professional life 4. Analyze harmony in nature and existence , and work out their mutually fulfilling participation in the nature. 5. Write a comprehensive report on implication of adopting a holistic view on ethical human conduct

15.	MET-005	<ol style="list-style-type: none"> 1. Evaluate the Kinematic Chain, Mechanisms and their Inversions; analyze velocity and acceleration of various mechanisms. 2. Solve problem-related to friction. Explain the principle and applications of clutch and brake. 3. Explain details of gear tooth profiles and conditions of interference and undercutting. 4. Differentiate the different types of gear trains using analytical and tabular methods. 5. Apply the principle and applications of a gyroscope. 6. Explain and draw cam profile and velocity-acceleration analysis for different cams and followers 7. Analyze the principle and verify the practical vs. theoretical torque relation for gyroscope and its applications. Explain static and dynamic balancing.
16.	MET-006	<ol style="list-style-type: none"> 1. Apply the basic concepts, Zeroth and First Laws of Thermodynamics, and their analysis over control mass and control volume systems. 2. Describe Second Law of Thermodynamics and its corollaries along with estimation of change of entropy and availability during for various thermodynamic processes. 3. Estimate various thermodynamic properties of pure substance, ideal gas and mixture of ideal gases with the help of established thermodynamic relations, Mollier Chart and Steam Tables. 4. Derive various thermodynamic relations such as Joule-Thomson, Clausius Clapeyron, etc., and performance parameters of various gas power cycles. 5. Analyze various Vapour power cycles and effect of operating parameters on their performance.
17.	MET-007	<ol style="list-style-type: none"> 1. Describe the mechanical behaviour of engineering materials subjected to various types of stresses and compute the resulting strain and strain energy. 2. Analyse the bending of various types of beams under static loading conditions and compute the shear stress distribution for different cross sections of beams. 3. Show knowledge of principal planes, stresses and strains and analyse the elastic deformation of members and apply different theories of elastic failures. 4. Compute the torsion for the circular shaft and analyse the crippling load and equivalent length for various types of columns of different end conditions. 5. Compute the deflection of beams and shafts under static loading and stresses in thin walled cylindrical and spherical vessels.

18.	MET-008	<ol style="list-style-type: none"> 1. Evaluate the classification, scope and relative applications of basic manufacturing methods used in industries. 2. Apply the different casting methods with their process details, applications and limitations. 3. Analyze the characteristics, process details and applications of rolling, forging, extrusion and drawing operations. 4. Classify and explain in detail the different welding methods with brief introduction to brazing and soldering. 5. Evaluate the powder metallurgy process with its typical advantages, limitations and industrial applications
19.	MEP-008	<ol style="list-style-type: none"> 1. Outline the various types of boilers, mountings & accessories. 2. Evaluate the working of steam turbine, steam condenser, cooling tower & reciprocating compressor. 3. Demonstrate the various components of steam power plant. 4. Analyze the performance parameters of various energy conversion devices.
20	MEP-009	<ol style="list-style-type: none"> 1. Apply the concept of the constructional features, working principle and operation performed on lathe, shaper, milling and grinding machine tool. 2. Select appropriate cutting tools, suitable work & tool holding devices, optimum cutting parameters and safe working procedures on various machine tools. 3. Produce the part as per given drawing on lathe, shaper, milling and grinding machine tool and perform its error analysis. 4. Measure various sand properties by performing sand moulding tests and prepare a green sand mould from a given split pattern. 5. Perform the welding operation as per given drawing using TIG, MIG and SPOT welding techniques and exhibit use of safe working procedures and appropriate welding equipments
21.	MEP-010	<ol style="list-style-type: none"> 1. Apply the principle and discuss inversions of four bar, single slider and double slider chain. 2. Steering Mechanisms- Davis and Ackerman; quick return mechanism and draw its velocity and acceleration diagrams. 3. Demonstrate cam and followers arrangements available in laboratory and plot displacement v/s angle of rotation curve for these. 4. Determine co-efficient of friction of different materials using two roller oscillating arrangement and differentiate among. 5. Describe, discuss and differentiate various types of dynamometers, Brakes, Clutches and Gear boxes with their applications 6. Evaluate the principle and verify the practical vs. theoretical torque relation for gyroscope and its applications. Explain

		static and dynamic balancing.
Mechanical Engineering:V Semester		
22.	BMET-501	<ol style="list-style-type: none"> 1. Interpret the engineering relationships between Human Factors and Engineering & task design 2. Analyze, synthesize, and control design using Anthropometry & Anthropometric data. 3. Illustrate the relationships between Human capacity & Display Design. 4. Develop knowledge and application of Environmental working conditions in task design. 5. Gain understanding of use of Ergonomics in work organisations. 6. Evaluate the basic concept of Advanced Time & Motion Study & its introductory applications.
23.	BMET-502	<ol style="list-style-type: none"> 1. Apply the knowledge of Indian Standard codes and engineering fundamentals of material selection and manufacturing considerations in design. 2. Identify the factors for engineering components design and analyze various members subjected to direct stress. 3. Design various members such as beams, levers, laminated springs for bending and stiffness. 4. Design various machine components under torsion such as shafts, shaft couplings, and keys. 5. Design various threaded fasteners, power screws and curved machine components
24.	BMEP- 502	<ol style="list-style-type: none"> 1. Apply the knowledge of engineering fundamentals to material selection and Indian Standard designation of various materials and manufacturing consideration in design. 2. Design various machine components under direct stresses. 3. Design various machine components under bending and torsion. 4. Design threaded fasteners and various machine components under combined stresses.
25.	BMET-503	<ol style="list-style-type: none"> 1. Apply the governing laws and modes of heat transfer, derive general heat conduction equation in various coordinate systems and apply concept of electrical analogy on various thermal systems. 2. Compute temperature distribution and heat transfer rate in steady and unsteady state heat conduction and analyse heat transfer from extended surfaces with various boundary conditions. 3. Interpret and analyse natural and forced convective heat transfer with dimensional analysis using empirical relations for various flow situations. 4. Analyse the performance of heat exchangers under different

		<p>flow conditions using LMTD and NTU method.</p> <p>5. Analyse radiative heat transfer between two or more black/gray bodies by applying the concept of electrical analogy, shape factor and reradiating surfaces.</p>
26.	BMET-504A	<ol style="list-style-type: none"> 1. Analyse the historical development, types and thermodynamic cycle of IC engines. 2. Evaluate performance parameters and analyze the effect of operating parameters on engine performance. 3. Analyze the combustion & emission characteristics. Explain emission norms and discuss the effect of alternative fuels on engine combustion. 4. Identify the type of fuel system, lubrication system and cooling system for different operating conditions of CI and SI engines. 5. Describe dual and multi fuel engines, rotary engine, stratified charge, free piston and VCR Engine.
27.	BMET-505	<ol style="list-style-type: none"> 1. Describe the scope, outcomes, evolution and various philosophies of quality management and cost of quality. 2. Analyze and interpret the process quality using various graphical and statistical tools like control charts, probability distribution, sampling distribution, hypothesis testing, DOE and acceptance sampling. 3. Analyse an industrial process using \bar{X} and R charts, and to determine the process capability. 4. Verify the various sampling distributions (i.e., Normal distribution, Binomial and Poisson distribution) experimentally. 5. Construct and interpret control chart for proportion nonconforming (p chart) and control chart for non-conformities (c chart) for a given case. 6. Plot the operating characteristics curve for a given single sampling attribute plan and compare the actual O.C. curve with theoretical O.C. curve
		Mechanical Engineering:VI Semester
28.	BMET-601	<ol style="list-style-type: none"> 1. Interpret and apply performance laws to turbomachines of different types. 2. Determine energy transfer in turbomachines of different designs 3. Analyze flow through two dimensional turbine and compressor cascade. 4. Analyze flow through centrifugal compressor and its performance. 5. Design axial flow turbomachine with radial equilibrium and resolve practical cases of fan. 6. Analyze flow through radial flow turbine and wind turbine

29.	BMET-602	<ol style="list-style-type: none"> 1. Apply knowledge of design considerations such as variable loads, endurance stresses, size, surface finish, notch sensitivity, and stress concentration and design Shafts and Bolts under variable stresses. 2. Design of various IC engine components including piston, cylinder, connecting rod and crank shaft. 3. Design of helical springs like compression, tension, torsional and variable stresses; and design belt, rope and pulley drive systems. 4. Design of spur, helical, bevel and worm gears under wear and dynamic load consideration using Lewis and Buckingham equations. Analyze bearing reactions due to gear tooth forces. 5. Design of sliding and journal bearings for given hydrodynamic, hydrostatic, boundary, thermal equilibrium conditions and minimum film thickness of lubrication. 6. Select anti-friction bearings for different loads and load cycles, mounting of the bearings, Method of lubrication.
30.	BMEP- 602	<ol style="list-style-type: none"> 1. Apply knowledge of design considerations in fatigue loading and analyze bolts under variable stresses 2. Design the curved beams 3. Design belt, rope and pulley drive 4. Design spur, helical, bevel and worm gears under dynamic load conditions. 5. Design of Sliding contact bearing and Anti-friction bearing under various load conditions.
31.	BMET-603	<ol style="list-style-type: none"> 1. Analyze the reversed Carnot cycle and vapour compression refrigeration cycle (VCR). 2. Select the air-refrigeration systems for aircraft, and vapour absorption refrigeration system for rural and remote areas and select environmental friendly refrigerants considering the international standards. 3. Identify the Psychrometric processes for different applications and design the parameters of air-conditioning system as per standards. 4. Analyze the human comfort, ASHRAE chart and concept of effective temperature. 5. Estimate cooling load and heating load considering human comfort and optimize the air conditioning system as per requirements.

32.	BMEP-603	<ol style="list-style-type: none"> 1. Apply the basics concept about the basic components of refrigeration system and calculate its performance with different configurations. 2. Analyze about the basic components of air conditioning and investigate the effect of psychometric processes on the performance of air conditioners. 3. Acquire the knowledge of psychometric processes and applications of air washer. 4. Ability to demonstrate about the thermodynamic cycle of air compressors and compute the volumetric efficiency.
33.	BMET-604C	<ol style="list-style-type: none"> 1. Describe rapid product development, rapid prototyping and applications. 2. Classify and describe the different RP processes and their applications. 3. Select and use correct CAD formats in the manufacture of a 3D printed part. 4. Use appropriate tooling for rapid prototyping process and rapid prototyping techniques for reverse engineering. 5. Demonstrate the 3d printer machine.
34.	BMET-605	<ol style="list-style-type: none"> 1. Demonstrate knowledge of industrial robots, characteristics, end effectors and actuators. 2. Apply spatial transformation to obtain forward and inverse kinematics 3. Solve robot dynamics problems, generate joint trajectory for path planning 4. Describe working principle of various sensors and program different operations 5. Appreciate applications of robots in industry.
Mechanical Engineering:VII Semester		
35.	BMET 701	<ol style="list-style-type: none"> 1. Analyze numerical and analytical problems in · Nanomaterial size by using Scanning Electron Microscope and X-Ray diffraction 2. Design and fabricate devices based on nanostructures like · Nano solar cell · Nano cantilever · Nano bio-sensor 3. Synthesize nano particle of different materials to solve the problems related to fabrication of nanostructures. 4. Select appropriate technique for fabrication of nanostructures and Nano composites. 5. Apply ethical standards and legal issues while using chemical substances in fabrication of new nanostructures.

36.	BMET- 702	<ol style="list-style-type: none"> 1. Demonstrate the knowledge about role of computer and automation in manufacturing. 2. Describe the NC system, components and its advantages and adaptive control. 3. Prepare a part program using G & M codes for drilling, milling and lathe operations. 4. Describe the application of computer in CAPP, material handling, and quality control. 5. Explain the concept of group technology, FMS, collaborative engineering, agile and lean manufacturing.
37.	BMET-703(A)	<ol style="list-style-type: none"> 1. Analyse and ensure the desired plant availability at an optimum cost within the safety prescription. 2. Student able to know about the objectives of maintenance. 3. Discuss various condition monitoring techniques. 4. Explain the repair methods of beds and slide ways. 5. To minimize the total cost of unavailability and resources.
38.	BMET-704 (A)	<ol style="list-style-type: none"> 1. Describe the basics of energy management, energy demand management and energy auditing. 2. Highlight the need for energy conservation and describe the resource development for sustainability. 3. Identify the need for energy management in different sectors. 4. Forecast the energy demand for different sectors and integrate different energy resources to meet the energy demand. 5. Describe various renewable energy resources and their management for cleaner production.
39.	BMEP-705	<ol style="list-style-type: none"> 1. Analyse and use the scripts and functions in developing programs in MATLAB/SCILAB. 2. Use arrays, vectors and matrices in developing programs in MATLAB/SCILAB. 3. Use loops and nested loops in developing programs in MATLAB/SCILAB. 4. Apply commands in plotting graphs for various functions using the MATLAB/SCILAB interface. 5. Solve differential equations using MATLAB/SCILAB. 6. Apply different toolboxes available for MATLAB/SCILAB to access their advanced capabilities.
Mechanical Engineering:VIII Semester		
40.	BMET- 801	<ol style="list-style-type: none"> 1. Solve linear programming problems using appropriate techniques and optimization solvers, interpret the results obtained. 2. Determine optimal strategy for Minimization of Cost of shipping of products from source to Destination/ Maximization of profits of shipping products using various methods, Finding

		<p>initial basic feasible and optimal solution of the Transportation problems</p> <ol style="list-style-type: none"> 3. Optimize the allocation of resources to Demand points in the best possible way using various techniques and minimize the cost or time of completion of number of jobs by number of persons. 4. Model competitive real-world phenomena using concepts from game theory. Analyse pure and mixed strategy games 5. Formulate Network models for service and manufacturing systems, and apply operations research techniques and algorithms to solve these Network problems
41.	BMET 802	<ol style="list-style-type: none"> 1. Analyse and compare the construction, working, feature, relative merits and application of different types of chassis, bodies, frames, clutches and brakes of automobile and use suitable diagram to support their description. 2. Explain construction, working and features of different elements of power transmission in automobile namely gear boxes, fluid coupling, hydraulic torque convertor, overdrive, front and rear wheel drive, propeller shaft, differential, power transmission through rear and front axle and automatic transmission system. 3. Compare the concept of steering geometry including camber/ caster, king pin inclination, toe in/ toe out, tyre threads and retreading, causes of tyre wear and tear, construction and features of different types of tyres, wheels, steering mechanism and suspension systems with neat sketches as required. 4. Outline the construction, features and working of automotive electrical and electronics system of an automobile and their different parts, namely battery, alternator, starter, ignition systems, electric wiring, head lamps and electric horn. 5. Explain the importance and working of automobile air conditioning system and different safety devices such as Night Vision System, Global Positioning System, Antilock Braking System, Air Bags and Belts with reference to automotive safety requirements.
42.	BMET-803(A)	<ol style="list-style-type: none"> 1. Analyse the different components of thermal power plant. 2. Explain different components of Nuclear power plant with safety features. 3. Compare and analyze different economic aspects associated with different power generation systems. 4. Analyze different environmental aspects of power generation systems. Outline national energy scenario and analyze Rankine cycle. 5. Analyze Steam nozzles and Steam turbines.

		6. Outline Steam condensers, cooling towers and feed water treatments. Outline various nuclear reactors. Analyze Economics of Power Generation.
43.	BMET-803 (B)	<ol style="list-style-type: none"> 1. Determine the various parameters related to solar radiation. Select and use of appropriate solar radiation measurement techniques. 2. Select the appropriate material and design for flat plate collector and concentrating collectors. Calculate performance parameters of collectors and benefits of green energy. 3. Explain the thermal energy storage and its applications. 4. Apply the concept of solar pond, Solar Chimney, Solar Furnaces, Solar Greenhouses, Solar Passive Heating and Cooling system. Compare with conventional systems and evaluate environment effects.
44.	BMET-804(B)	<ol style="list-style-type: none"> 1. Apply the process and philosophical basis of scientific inquiry. 2. Describe the basic principles of ecology, including population ecology, community ecology, and ecosystem function. 3. Describe the characteristics of the major biomes and ecosystems of the Earth. 4. Describe the interrelationships between land, sea, the atmosphere and the living things that occupy these environments. 5. Discuss the role that humans play in affecting the characteristics of the environment. Evaluate current environmental issues and problems including the solutions and management practices that have been used or offered to address these issues and problems.
M. Tech.-Thermal Engineering:I Semester		
45.	AHT-301	<ol style="list-style-type: none"> 1. Solve the various engineering problems in different mathematical realm. 2. Analyze the analytical and numerical methods to deal with mathematical problems. 3. Explain and apply how to model the engineering problems and their solutions. 4. Implement the solutions to real-time complex engineering problems. 5. Demonstrate with mathematical methodology.

46.	TET-301	<ol style="list-style-type: none"> 1. Apply and perform the analysis of steady and unsteady systems as per First and second law of thermodynamics. 2. Derive various thermodynamic relations such as Joule-Thomson, Clausius Clapeyron, etc. 3. Deduce the relations to evaluate various thermodynamics properties for real gas, ideas gas and their mixtures. 4. Describe the criteria of equilibrium, homogeneity and stability for multi component thermodynamic systems. 5. Analyze combustion using various available basic concepts, relations and laws of thermodynamics.
47.	TET-302	<ol style="list-style-type: none"> 1. Evaluate the modes and laws of heat transfer processes, General parameters influence the value of different coefficient. 2. Analyze one dimensional steady state conduction with variable thermal conductivity and with internal distributed heat source; local heat source in non- adiabatic plate and heat transfer from extended surfaces. 3. Know unsteady state heat conduction and use of Heisler chart, for plates, cylinders, and spheres suddenly immersed in fluids. 4. Analyze Natural and forced convection and use of empirical relations for flow over a flat plate. 5. Explain different law and radiation properties, radiation through non-absorbing media; Hottels method of successive reflections. Radiation through absorbing media; logarithmic decrement of radiation
48.	TET-305	<ol style="list-style-type: none"> 1. Evaluate instantaneous fluid velocity and track the fluid particles in the flow field, compute flow rate and pumping power of the fluid 2. Solve benchmark problems using NSE to estimate the velocity profile and shear stress 3. Apply NSE in real time engineering problems to model low and high Reynolds number flow and boundary layer flows 4. Estimate the total drag and lift forces associated with structures immersed in the fluid 5. Predict the length scale of eddies and Reynolds stress
49.	TET-307	<ol style="list-style-type: none"> 1. Interpret and distinguish between the different types of conventional and non-conventional fuels. 2. Demonstrate the utilization of synthetic and substitute fuels for practical applications. 3. Describe various parameters that are utilized to characterize fuels and its combustion process. 4. Analyze the kinetic mechanism involved in combustion and chemical reaction.

		5. Differentiate between diffusion and premixed flame and their utilization in combustion devices.
50.	AHT-302	<ol style="list-style-type: none"> 1. Identify and formulate problem, and design required setup to carry out a research. 2. Search appropriate literature for conceptual basis of research. 3. Enlist the research methodology tools for data collection and analysis. 4. Create a time frame for completing the project in form of gaint chart. 5. Communicate the research summery, research gaps and research objectives through an effective report.
M. Tech.-Thermal Engineering:II Semester		
51.	TET-303	<ol style="list-style-type: none"> 1. Identify the physics of convective transport processes 2. Have a working knowledge of numerical and analytical methods for solving engineering problems in this area. 3. Analyze external and internal forced convection by applying existing empirical correlations. 4. Aexamine the convective heat transfer in porous media and in systems involving phase change. 5. apply the concepts to analyze industrial problems.
52.	TET-304	<ol style="list-style-type: none"> 1. Ability to have knowledge of different aspects of designing of a thermal system, 2. Identify and examine a design problem associated to a thermal system, 3. Analyze the basics of modeling and their associated techniques, 4. Explain economic aspect of designing and able to apply different techniques of optimization applicable to thermal system.
53.	TET-316	<ol style="list-style-type: none"> 1. Describe the concept of refrigeration and its unit. 2. Ability to differentiate the different methods of refrigeration. 3. Compare the air refrigeration cycle and its application in air craft. 4. Demonstrate vapour compression refrigeration system 5. Explain vapour absorption refrigeration system 6. List the various properties of refrigerants understanding the

		energy market regulations and pricing mechanisms
54.	TET-313	<ol style="list-style-type: none"> 1. Compare renewable and non-renewable sources of energy. 2. Gain knowledge about working principle of various solar energy systems 3. Evaluate the application of wind energy and wind energy conversion system. 4. Develop capability to do basic design of bio gas plant. 5. Analyze the applications of different renewable energy sources like ocean thermal, hydro, geothermal energy etc.
55.	TET-320	<ol style="list-style-type: none"> 1. Compare various types of I.C. Engines, Cycles of operation and Identify fuel metering, fuel supply systems for different types of engines. 2. Differentiate the combustion phenomena in SI and CI engines and analyze the effect of various operating variables on engine performance. 3. Evaluate performance Analysis of IC Engine and justify the suitability for different applications. 4. Explain the conventional and non-conventional fuels and effects of emission formation of IC engines, its effects and the legislation standards. 5. Analyze the exhaust gases emission, pollution and its control.
M. Tech.-Thermal Engineering: III Semester		
56.	TET-321	<ol style="list-style-type: none"> 1. Discuss about the likely impacts of the project on individual, society and environment. 2. Analyse the various indicators to assess the state of health, economy and standard of life either prospering or deteriorating. 3. Assess the impacts on water bodies and land use related to construction and execution of projects. 4. Analyse the statement of 'A smoke tube belching out smoke is a symbol of prosperity' by considering pros and cons. 5. Classify the different methodologies of EIA and conditions under which a particular method can be adopted.
57.	TET-323	<ol style="list-style-type: none"> 1. Describe need for alternative fuels for Internal combustion engine and alternative drive systems for automobiles, principle of solar energy collection, construction of photo voltaic cells 2. Compare various types of properties, methods of production of Bio gas, methanol, ethanol, SVO, Bio diesel 3. Illustrate the use of hydrogen and various gaseous fuels, reformulated conventional fuels & future alternative fuels for internal combustion engine application. 4. Explain the various aspects of electrical and Hybrid vehicles

M. Tech.-Thermal Engineering: IV Semester		
58.	TEP-308	<ol style="list-style-type: none"> 1. Apply the research methodology tools for data collection and analysis. 2. Perform the related investigation with the help of available software and hardware tools 3. Interpret the research outcomes through various statistical tools and validate them. 4. Deduce the relevant/ substantial technical content from the compiled data and compose research publications 5. Communicate the research outcomes through an effective report.