MECHANICAL ENGINEERING		
Course Code 20MTP12	FINITE ELEMENT METHOD IN HEAT TRANSFER	
CO1	Establish the mathematical models for the complex analysis problems and predict the nature of solution.	
CO2	Formulate the element characteristic for linear and nonlinear matrices and vectors.	
CO3	Identify the boundary conditions and their incorporation in to the FE equations.	
CO4	Solve the problems with simple geometries, with hand calculations involving the fundamental concepts.	
CO5	Interpret the analysis results for the improvement or modification of the system.	
Course Code 20 MTP13	ADVANCED FLUID MECHANICS	
CO1	Illustrate the basic concepts fluid flow and their governing equations	
CO2	Analyse the laminar and turbulent flow problems.	
CO3	Analyse one dimensional incompressible and compressible fluid flow Problems	
CO4	Distinguish normal and oblique shocks and their governing Equations.	
CO5	Describe the instruments and methods for flow measurements	
Course Code 20MTP14	COMBUSTION THERMODYNAMICS	
CO1	Understand the basic thermodynamic concepts for combustion phenomena.	
CO2	Describe the fuel energy conversion systems.	
CO3	Apply the concept of flam flow mechanism in combustion process.	
CO4	knowledge of adiabatic flame temperature in the design of combustion devices.	
CO5	Identify the phenomenon of flame stabilization in laminar and turbulent flames.	
Course Code 20 MTP15	ADVANCED POWER PLANT CYCLES	
CO1	Distinguish the various power plant cycle and their working principles.	
CO2	Describe the working principles of different components of power plant.	
CO3	Explain the concepts of power generation by nuclear power plant.	
CO4	Illustrate the concept of hydroelectric power generation.	
CO5	Explain the concept of pollution and its effects.	

ourse Code 20 MTPL16	THERMAL ENGINEERING MEASUREMENT LABORATORY
CO1	Perform experiments to determine the coefficient of discharge of flow measuring devices.
CO2	Conduct experiments on hydraulic turbines and pumps to draw characteristics.
CO3	Test basic performance parameters of hydraulic turbines and pumps and execute the knowledge in real life situations.
CO4	Identify exhaust emission, factors affecting them and report the remedies.
CO5	Determine the energy flow pattern through the hydraulic machines and I C Engine
CO6	Exhibit his competency towards preventive maintenance of IC engines.
ourse Code 20RMI17	RESEARCH METHODOLOGY AND IPR
CO1	Discuss research methodology and the technique of defining a research problem
CO2	Explain the functions of the literature review in research, carrying out a literature search, developing theoretical and conceptual frameworks and writing a review.
CO3	Explain various research designs, sampling designs, measurement and scaling techniques and also different methods of data collections.
CO4	Explain several parametric tests of hypotheses, Chi-square test, art of interpretation and writing research reports
CO5	Discuss various forms of the intellectual property, its relevance and business impact in the changing global business environment and leading International Instruments concerning IPR.■
ourse Code 20 MTP21	ADVANCED HEAT TRANSFER
CO1	Describe the different modes of heat transfer with both physics and the mathematical concept.
CO2	Use the concepts of radiation heat transfer for enclosure analysis.
CO3	Explain the concepts of Boundary layer.
CO4	Formulate mathematical functions for two-dimensional and three dimensional heat conduction problems.
CO5	Describe the free and forced convection problems in real time applications.
Course ode 20 MTP22	STEAM AND GAS TURBINES
CO1	Describe the working principles of Gas and steam turbines nozzle and diffusers.

CO2	Explain the principles of thermodynamic concept to determine the performance of steam and gas turbines.
CO3	Illustrate the concepts of axial flow and centrifugal compressors.
CO4	Differentiate axial flow and radial flow gas turbines for their analysis.
CO5	Identify the various losses associated with the turbines.
Course Code 20MTP23	REFRIGERATION AND AIR CONDITIONING
CO1	Understand concepts of refrigeration and air-conditioning process and systems.
CO2	Employ the theoretical principles to simple, complex vapour compression and vapour absorption refrigeration systems.
CO3	Understand conventional and alternate refrigerants and their impact on environment.
CO4	Apply the heat load calculation to design the air-conditioning systems.
CO5	Describe the concepts to design air distribution systems.
Course Code 20MTP241	ENERGY CONSERVATION AND MANAGEMENT
CO1	Understand the various energy conservation and improvement techniques.
CO2	Illustrate the Energy scenario.
CO3	Employ the principles of thermal engineering and energy management to improve the Performance of thermal systems.
CO4	Assess energy projects on the basis of economic and financial criteria.
CO5	Describe methods of energy production for improved utilization
Course Code 20MTP251	SOLAR THERMAL TECHNOLOGIES AND ITS APPLICATIONS
CO1	Analyse the energy concepts on solar devices for various thermal properties.
CO2	Analyse the solar thermal devices for various tracking modes.
CO3	Evaluate the performance of various solar thermal technologies.
Course Code 20 MTPL26	SIMULATION LABORATORY
Course Code 20MTP27	TECHNICAL SEMINAR
Course Code 20MTP31	DESIGN OF HEAT TRANSFER EQUIPMENTS FOR THERMAL POWER PLANT
C01	Understand the physics and the mathematical treatment of typical heat exchangers.
CO2	Employ LMTD and Effectiveness methods in the design of heat exchangers and analyze the importance of LMTD approach over AMTD approach.
CO3	Examine the performance of double-pipe counter flow (hair-pin) heat exchangers.
CO4	Design and analyze the shell and tube heat exchanger.

005	Understand the fundamental, physical and mathematical aspects of boiling and
005	condensation.
CO6	Classify cooling towers and explain their technical features.
Course Code 20MTP322	THEORY OF IC ENGINES
CO1	Distinguish different Fuel-air and actual cycles.
CO2	Demonstrate the different types of injection and carburetor systems
CO3	Formulate the flow and combustion phenomenon for modeling
CO4	Identify the various types of emissions, noise and their control systems
CO5	Recommend the suitable alternative fuel for IC Engine.
Course Code 20MTP332	NON-CONVENTIONAL ENERGY SOURCES
CO1	Describe the need of renewable energy resources, historical and latest developments.
	Describe the use of solar energy and the various components used in the energy
CO2	production with respect to applications like-heating, cooling, desalination, power generation, drying, cooking etc.
CO3	Appreciate the need of Wind Energy, wave power, tidal power, ocean thermal power and geothermal and the various components used in energy generation.
CO4	Understand the concept of Biomass energy resources and their classification, types of biogas Plants applications
Course Code 20MTP34	PROJECT WORK PHASE – 1
CO1	Demonstrate a sound technical knowledge of their selected project topic.
CO2	Undertake problem identification, formulation, and solution.
CO3	Design engineering solutions to complex problems utilising a systems approach.
CO4	Communicate with engineers and the community at large in written an oral forms.
CO5	Demonstrate the knowledge, skills and attitudes of a professional engineer.
Course Code 20MTP35	MINI PROJECT
CO1	Present the mini-project and be able to defend it.
CO2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task.
CO3	Habituated to critical thinking and use problem solving skills
CO4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms.
CO5	Work in a team to achieve common goal.
CO6	Learn on their own, reflect on their learning and take appropriate actions to improve it.

Course Code 20MTPI36	INTERNSHIP / PROFESSIONAL PRACTICE
CO1	Gain practical experience within industry in which the internship is done.
CO2	Acquire knowledge of the industry in which the internship is done.
CO3	Apply knowledge and skills learned to classroom work.
CO4	Develop a greater understanding about career options while more clearly defining personal career goals.
CO5	Experience the activities and functions of professionals.
CO6	Develop and refine oral and written communication skills.
C07	Identify areas for future knowledge and skill development.
CO8	Expand intellectual capacity, credibility, judgment, intuition.
CO9	Acquire the knowledge of administration, marketing, finance and economics
Course Code 20MTP41	PROJECT WORK PHASE -2
CO1	Present the project and be able to defend it.
CO2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task.
CO3	Habituated to critical thinking and use problem solving skills
CO4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms.
CO5	Work in a team to achieve common goal.
CO6	Learn on their own, reflect on their learning and take appropriate actions to improve it.