Viswambhara Educational Society

VAAGDEVI COLLEGE OF ENGINEERING

UGC-Autonomous

Department of Mechanical Engineering

COURSE OUTCOMES FOR M.TECH – THERMAL ENGINEERING R18 FOR THE YEAR 2018-2021

Course Outcome	Semester I Sem	Subject Name (Subject Code) ADVANCED THERMODYNAMICS (M18TE01)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	Emphasize the relevance of Evaluation of thermodynamic properties of working substance			
2	Know the applications of Energy properties of real gases, Vapour pressure, Clausius			
3	Know about Psychometric mixture properties and psychometric chart, Air conditioning processes, cooling towers.			
4	Get uses of the Combustion Reactions, Enthalpy of formation. Entropy of formation, Reference levels of tables. Energy of formation, Heat reaction			
5	Solve a problem in Review binary vapour cycle, co generation and combined cycles, Second law analysts of cycles and Refrigeration cycles.			
6	Know about Fuel cells, Thermo electric energy, Thermo ionic power generation, Thermodynamic devices magneto hydronamic generations, Photovoltaic cells.			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code) ADVANCED FLUID MECHANICS (M18TE02)**	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Know about Applications of In viscid Flow of Incompressible Fluids			
2	Applicability of Basic Laws of fluid Flow			
3	Understanding the Viscous Flow			
4	Get Knowledge on Boundary Layer Concepts			
5	Deal with Fundamental concept of turbulence			
6	Deal with Thermodynamic basics – Equations of continuity, Momentum and Energy – Acoustic Velocity Derivation of Equation for Mach Number			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code) ADVANCED REFRIGERATION AND AIR CONDITIONING (M18TE03)**	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Deal with Components of Vapor Compression System			
2	Develop the study skills on Production of Low Temperature			
3	Develop the study skills on Steam Jet refrigeration system: Representation on T-s and h-s diagrams – limitations and applications			
4	Enable students on Construction of Psychometric chart, Requirements of Comfort Air – conditioning ,Thermodynamics of human body.			

5	Equip students with Parameters influencing the Effective Temperature. Summer, winter and year round air – conditioning systems			
6	Make students aware of Humidification and dehumidification equipment, Systems of Air cleaning Grills and diffusers Fans and blowers Measurement and control of Temperature and Humidity			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** TURBO MACHINES (M18TE04)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the Fundamentals of turbo machines and their applications			
2	Applicability of steam nozzle and steam turbine in power plant and the relation of their flow on performance of plant.			
3	To equip students with the fundamental of thermodynamics concepts for gas dynamics			
4	Get Knowledge about type and working principle of centrifugal compressors			
5	Deal with Fundamental concept of Axial flow compressors and different type of cascade systems			
6	To understand relations of degree of reaction for maximum performance of axial flow gas turbines			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** ENERGY MANAGEMENT (M18TE05)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	To understand the need of energy management and its principles.			
2	Analyze the requirement of energy audit and its concepts.			
3	Understand the concepts of economic analysis and its scope.			
4	Get Knowledge about methods of evaluation of projects.			
5	Deal with Fundamental concept energy audit			
6	Demonstrate the application of alternative energy sources in energy management			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** GAS TURBINES (M18TE06)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Explain the Applications and classifications of gas turbine			
2	Applicability of different processes for improving the performance of the plant.			
3	Analysis of Ideal and Real cycle gas turbines and concept of improving the efficiency.			
4	Get Knowledge about fundamental equations and laws of rotating machines			
5	Learn the basic and advanced concepts and working principles of different type of compressors.			
6	To determine the importance of effective combustion system for maximize the efficiency of gas turbine plant.			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** NON CONVENTIONAL ENERGY SOURCES (M18TE07)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				

1	Know about Solar Energy Applications: Solar water heating. Space heating, Active and passive heating Energy
2	Deal with Structure of earth, Geothermal Regions, Hot springs. Hot Rocks
3	Deal with to solve a problem in Thermionic & thermoelectric generation, MHD generator.
4	Deal with Fusion, Fusion reaction, P-P cycle, Carbon cycle, Deuterium cycle, Condition for controlled fusion, Fuel cells and photovoltaic.
5	To enable students on energy sources. Plant productivity, Biomass wastes, aerobic and Anaerobic bioconversion processed
6	To equip students with Wind, Beaufort number, Characteristics, Wind energy conversion systems, Types, Betz model. Interference factor

Course Outcome	Semester I Sem	Subject Name (Subject Code) EQUIPMENT DESIGN FOR THERMAL SYSTEMS (M18TE08)	No. of Hours L:3 T:0 P:0	Credits: 3

After the completion of this course, the students should be able to	
1	Get details about heat exchanger and its classifications.
2	Determine the effect of increasing pipes in performance of heat exchanger and get idea about double pipe heat exchanger.
3	Understand the working principle of steam condenser and explore the condensation of single vapors.
4	Get Knowledge about processes like vaporization, evaporation and reboiling and study about the equipments used for these processes
5	To understand the working principle of cooling tower
6	Determine the design requirement of effective cooling tower

Course Outcome	Semester I Sem	Subject Name (Subject Code) ADVANCED THERMAL ENGINEERING LAB (M18TE09)	No. of Hours L:0 T:0 P:4	Credits: 2

After the completion of this course, the students should be able to	
1	Understand the Analysis of air conditioning unit.
2	Understand the Analysis of heat pipe.
3	Know about Performance analysis of flat plate collector.
4	Know about Performance analysis of evacuative tube concentrator

Course Outcome	Semester I Sem	Subject Name (Subject Code) MODELING AND ANALYSIS LAB-I (M18TE10)	No. of Hours L:0 T:0 P:4	Credits: 2

After the completion of this course, the students should be able to	
1	Understand the Analysis of flow profile on the designed nozzle.
2	Understand the Designing the diffuser and Analysis of flow profile on the designed diffuser.
3	Understand the Analysis of fluid flow on over curved surface.
4	Understand the Analysis of force exerted by the fluid jet on fixed flat plate

Course Outcome	Semester I Sem	Subject Name (Subject Code) RESEARCH METHODOLOGY (M18MC01)	No. of Hours L:2 T:0 P:0	Credits: 2

After the completion of this course, the students should be able to				
1	Understand that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right			
2	Compose and write quality research reports and attain familiarity with intellectual property rights.			
3	Understand research problem formulation			
4	Analyze research related information			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** STRESS MANAGEMENT (M18AC02)	**No. of Hours L:2 T:0 P:0**	**Credits: 0**
After the completion of this course, the students should be able to				
1	To understand the need of energy management and its principles.			
2	Analyze the requirement of energy audit and its concepts.			
3	Understand the concepts of economic analysis and its scope.			
4	Get Knowledge about methods of evaluation of projects			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** ADVANCED HEAT TRANSFER (M18TE11)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Emphasize the General heat Conduction equation.			
2	Know the Lumped system analysis			
3	Know about Equations of fluid flow			
4	To understand the concept of free convection, boiling and condensation			
5	Get the knowledge about transfer of heat in the space and at higher temperature.			
6	Understand the concepts of mass transfer and significance of non dimensional numbers			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** ADVANCED I.C. ENGINES (M18TE12)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Know about Design and operating Parameters			
2	Applicability of Thermo-chemistry of Fuel-Air mixtures.			
3	Understanding the effect of Volumetric Efficiency on the performance of the engines.			
4	Get Knowledge on Mean velocity and turbulent characteristics.			
5	Deal with Abnormal combustion Fuel factors, MPFI.			
6	To determine Emissions, Measurement & Exhaust Gas Treatment			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** CRYOGENIC ENGINEERING (M18TE13)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	To understand the main concept of cryogenic systems.			
2	To know the importance and applications of gas liquefaction			
3	Understand the working of liquefaction systems for various types of gases			
4	Equip students with the knowledge of gas separation systems and purification systems.			

5	To impart knowledge on cryogenic refrigeration systems			
6	Make students aware applications of cryogenic system in space technology			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** JET PROPULSION AND ROCKET ENGINEERING (M18TE14)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	To understand the concept of turbo jet propulsion system and performance of flight.			
2	Enable students to learn the concept of rocketry and its fundamentals.			
3	To impart knowledge on the effect of nozzle design on the performance of jet propulsion.			
4	Get idea about the combustion chemistry of fuels used in rocketry.			
5	Equip students with the knowledge of advanced rocket engines.			
6	To learn the various method of liquid rocket propulsion system			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** ALTERNATE FUELS (M18TE15)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Know about Availability and properties of alternate fuels, general use of Alcohols, LPG, hydrogen, and ammonia.			
2	Deal with Properties as engine fuel, alcohols and gasoline blends.			
3	Deal with to solve a problem in performance in SI & CI Engines.			
4	Deal with performance and emission characteristics, bio diesel and its characteristics			
5	To enable students on Layout of an electric vehicle, advantage and Limitations, specifications, system components.			
6	To equip students with electronic control system.			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** ADVANCED COMPUTATIONAL FLUID DYNAMICS (M18TE16)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand Finite difference method, finite volume method, finite element method			
2	Consider Solution methods of elliptical equations			
3	Understand Boundary layer equations for laminar, turbulent flow			
4	Solve numerical on Burgers equations: Explicit and implicit schemes, Runge- Kutta method.			
5	Get knowledge on Formulations of incompressible viscous flows by finite difference methods.			
6	Get knowledge on Finite volume method via finite difference method			
Course Outcome	**Semester II Sem**	Subject Name (Subject Code) THERMAL AND NUCLEAR POWER PLANTS (M18TE17)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the Type of Power plants, Direct energy conversion system.			
2	Analysis and Understand Recent developments in power generation.			
3	Know about Feed water heaters.			

4	To impart knowledge on Combined cycle power plant and its importance.			
5	To understand the concepts of Nuclear Reactor and its Classification			
6	Get knowledge on Factors affecting the economics			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** THERMAL MEASUREMENTS & PROCESS CONTROLS (M18TE18)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the fundamental principles of measuring instruments.			
2	Identify the working principle of all the instruments used to determine the flow.			
3	Develop the advanced thermometers for different type of operations.			
4	Measure the level by direct or indirect methods.			
5	Impart knowledge on principles used for process control.			
6	Design open as well as closed loop control system			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** ADVANCED INTERNAL COMBUSTION ENGINES LAB (M18TE19)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
After the completion of this course, the students should be able to				
1	Understand the effect of change in compression ratio on the performance of diesel& petrol engine.			
2	Analyze the effect of change in fuel injection timing on the performance of diesel engine.			
3	Understand and analysis Flame propagation analysis of gaseous fuels.			
4	Use different type of fuels and analyze its effect on the performance of diesel and petrol			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** MODELING AND ANALYSIS LAB-II (M18TE18)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
After the completion of this course, the students should be able to				
1	Aware of Thermal stress analysis of piston head of diesel engine for real condition.			
2	Design of intake and exhaust valve for diesel engine.			
3	Analyze the thermal stress of crank rod of diesel engine for real operating conditions.			
4	Understand effect of thermal stress on the intake and outlet valve of IC engines			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** ENGLISH FOR RESEARCH PAPER WRITING (M18AC01)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
After the completion of this course, the students should be able to				
1	To understand the nuances of language and vocabulary in writing a Research Paper.			
2	To develop the content, structure and format of writing a research paper.			
3	To give the practice of writinga Research Paper.			
4	To enable the students to evolve original research papers without subjected to plagiarism			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** ADVANCED MATERIALS FOR THERMAL SYSTEMS (M18TE22)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**

After the completion of this course, the students should be able to				
1	Understand the fundamentals of different type of testing methods.			
2	Analysis and Understand Impact Behavior Heat Treatment of Steels and Cast Irons.			
3	Impart knowledge on fundamentals of Nuclear Power Plant and Their Materials			
4	Get knowledge about materials in Fuel cells and Solar Cells Electro catalyst.			
5	Determine the advancement of use of super alloys.			
6	Design advanced energy storage system.			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** COMPUTER SIMULATION OF SI & CI ENGINES (M18TE23)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Impart knowledge on importance of computer simulation of IC engines.			
2	To understand the concept of Wiebe's function in SI engine modeling.			
3	Determine the importance of Watsons and White house and Way models in CI engines.			
4	Understand the basics of gas exchange processes.			
5	Equip students with knowledge of heat transfer to the surrounding from the IC engines.			
6	Analyze the effect of friction in moving parts of the engines on the performance of engines			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** ADVANCED FINITE ELEMENT ANALYSIS (M18TE24)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the Basic concepts, historical back ground, applications of FEM.			
2	Analysis and Understand Virtual energy principle			
3	Know about 1-D Structural Problems.			
4	Impart knowledge on Hermite shape functions, stiffness matrix, and Load vector.			
5	Know about Finite element modeling of Axi-symmetric solids			
6	Get knowledge on Dynamic considerations and Dynamic equations			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** ADVANCED OPTIMIZATION TECHNIQUES & APPLICATIONS (M18MA01)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Know about the basics of one dimensional Optimization methods.			
2	Choose the ways to use Direct search method			
3	Calculate dynamic programming.			
4	Construct linear programming			
5	Analyze integer programming			
6	Categorize stochastic programming.			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** BUSINESS LAW AND ETHICS (M18MB23)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Know the Business Laws related to incorporating a company			

2	Identify the Importance of Ethics in Business
3	Categorize Cyber Crime and Legal Aspects.
4	Analyze Business Ethics.
5	Understand Negotiable Instruments Act – 1881
6	Compare Need for cyber laws in the Indian context.