

Program Name **Master of Technology in Thermal Engineering**

Course Name **Optimization Techniques**

Course Code **ME4107**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
<b>CO1</b>	Students should be able to first develop a basic understanding of different optimization techniques and then apply them through numerical problems for some of the important techniques of classical optimization	3	s
<b>CO2</b>	Students should be able to understand the principles of optimization through linear programming and applying the learnings though numerical problems	3	s
<b>CO3</b>	Students should be able to understand the different techniques of one dimensional optimization and applying the learnings though numerical problems	3	em
<b>CO4</b>	Students should be able to understand the different unconstrained optimization techniques and applying the learnings though numerical problems	2	em
<b>CO5</b>	Students should be able to understand the modern methods of optimization techniques and applying the learnings though numerical problems	2	em

Course Name: **Advanced Fluid Mechanics**

Course Code: **ME4101**

Unit-wise Course Outcome	Descriptions	Descriptions	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
<b>CO1</b>	Students should be able to understand about basics of fluid mechanics and concepts related to fluid statics.	3	s
<b>CO2</b>	Students should be able to know advanced techniques for experimental analysis of fluid flow	2	s
<b>CO3</b>	Students should be able to understand the various concepts related to principle to viscous flow.	2	s
<b>CO4</b>	Students should be able to understand the turbulent flow concept in depth .	3	s
<b>CO5</b>	Students should be able to understand concepts related to compressible fluid flow	3	em



**Course Name: Advanced Thermal Engineering**

**Course Code: ME4109**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurs hip (Emt)/ None (Use , for more than
<b>CO1</b>	Students should be able to understand fundamentals of thermodynamic laws	3	Em
<b>CO2</b>	Students should be able to understand the finite difference methods of conduction	3	s
<b>CO3</b>	Students should able to understand about the viscous flow behaviour	3	s
<b>CO4</b>	Students should able to know and apply the advanced concepts of power cycles	4	s
<b>CO5</b>	Students should be able to understand about gas dynamics concepts	3	em

**Course Name: Advanced Heat Transfer**

**Course Code: ME4103**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurs hip (Emt)/ None (Use , for more than
<b>CO1</b>	Students should be able to Understand the modes of heat transfer and its governing laws and also acquire skills to calculate heat transfer in steady state conditions in one dimension	3	Em
<b>CO2</b>	Students should be able to understand and calculate the 1D and 2D heat transfer in transient conditions and also able to solve problems using finite difference technique.	3	s
<b>CO3</b>	Students should be able to analyse convective heat transfer in different geometries and should know the use of empirical relations	3	s
<b>CO4</b>	Students should able to analyse different phase change heat transfer.	3	s
<b>CO5</b>	Students should be able to evaluate heat transfer by radiation from different complex geometries.	4	s

**Course Name: Steam Engineering**

**Course Code: ME4110**



Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurs hip (Emt)/ None (Use , for more than
<b>CO1</b>	Students will have the ability to explain working of different boilers and significance of mountings and accessories.	3	Em
<b>CO2</b>	Students will have the ability to use techniques, skills, and modern engineering tools necessary for boiler performance assessment.	3	s
<b>CO3</b>	Students will have a theoretical and practical background in thermal systems, and will have a good understanding of energy conservation fundamentals. Students will have the ability to analyze thermal systems for energy conservation.	3	s
<b>CO4</b>	Students will have the ability to design a steam piping system, its components for a process and also design economical and effective insulation.	3	s
<b>CO5</b>	Students will have the ability to analyze a thermal system for sources of waste heat design a systems for waste heat recovery.	4	s

**Course Name: Advanced Thermal Engineering Lab**

**Course Code:**

**ME4140**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurs hip (Emt)/ None (Use , for more than
<b>CO1</b>	Students should able to understand intricacies of solar plate collector and behaviour of different real gas.	2	Em
<b>CO2</b>	students should able to evaluate the performance parameters of IC engine, heat pipe, AC unit and reprocating compressor	5	S
<b>CO3</b>	students should able to evaluate the dryness fraction of steam	5	S

**Course Name: Simulation Modeling and Analysis**

**Course Code: ME4201**



Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurs hip (Emt)/ None (Use , for more than
<b>CO1</b>	Students should be able to understand the basic probability and statistic, random variables and their properties	2	Em
<b>CO2</b>	Students should be able to understand the Physical modeling methods and Various techniques	2	Em
<b>CO3</b>	Students should be able to study the various methods which is use in system simulation	2	S
<b>CO4</b>	Students should be able to understand the concept and techniques of system dynamics	2	s
<b>CO5</b>	Students should be able to understand the methods which is use to for the simulation of mechanical system	2	s

**Course Name: Simulation Modeling and Analysis**

**Course Code:**

**ME4240**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurs hip (Emt)/ None (Use , for more than
<b>CO1</b>	Students should be able to study the simulation software	2	Em
<b>CO2</b>	Students should be able to simulate the various heat transfer processes	3	S
<b>CO3</b>	Students should be able to analysis of various heat transfer instruments by using simulation software	4	S

**Course Name: Research Methodology**

**Course Code: ME4307**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurs hip (Emt)/ None (Use , for more than
<b>CO1</b>	Students should be able to Objectives of Research, Research Techniques, Hypothesis development	3	S,Em



<b>CO2</b>	Students should be able to Internal and External Validity, Reliability concept in scales, Stability Measures.	2	S
<b>CO3</b>	Students should be able to Interviewing, Questionnaires, Probabilistic, Precision and Optimal sample size.	3	S
<b>CO4</b>	Students should be able to Data Analysis, Factor Analysis, Cluster Analysis, Statistical (SPSS) Software	2	S
<b>CO5</b>	Students should be able to written reports, Abstract, Synopsis, Experimental, Results and Conclusions	2	S,Em

**Course Code: ME4340**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
<b>CO1</b>	Students should be able to understand and use the Basics Excel commands	3	S,Em
<b>CO2</b>	Students should be able to understand the Graphical presentation of data -Histogram, frequency polygon, pie-charts and bar diagrams	4	S
<b>CO3</b>	Students should be able to understand the SPSS, layout, menu and analyzing the data using different statistical techniques.	4	S

**Course Name: Cryogenic Engineering**

**Course Code: ME4202**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
<b>CO1</b>	Students should be able to understand fundamentals of cryogenic engineering.	3	Em
<b>CO2</b>	Students should be able to understand the liquefaction cycles and its related terminologies	2	none
<b>CO3</b>	Students should be able to understand the separation storage and transportation of cryogenic liquids	3	Em
<b>CO4</b>	Students should be able to understand the different cryogenic refrigerants	2	S
<b>CO5</b>	Students should be able to understand the handling of cryogen and its operating principles.	2	S

Course Name: Research ethics and IPR

Course Code: ME4212

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurs hip (Emt)/ None (Use , for more than
CO1	To know about research ethics and its significance	2	S,Em
CO2	To know about Plagiarism and approaches for originality in reporting	2	S
CO3	To know about IPR	2	S
CO4	To know about patent rights	2	S
CO5	To know about new development in IPR	2	S,Em

Course Name **Engineering Physics Lab**

Course Code **PH3140**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurs hip (Emt)/ None (Use , for more than
CO1	Students should be able to understand the process of performing the experiments on wavelength and focal length practically.	3	Em
CO2	Students should be able to verify the theoretical calculations with observed results in practical experiments.	3	S
CO3	Students should be able to Enhance the skills of using apparatus for verification of different laws.	3	S

Course Name: Refrigeration Machinery

Course Code: ME4206

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurs hip (Emt)/ None (Use , for more than
CO1	Students should be able to understand basic concepts and working of compressors.	3	S,Em
CO2	Students should be able to understand refrigeration system component	2	S,Em



<b>CO3</b>	Students should be able to deeply understand various hydraulic system	3	S
<b>CO4</b>	Students should be able to understand appliances and accessories	3	S
<b>CO5</b>	Students should be able to know about various system accessories and controls.	3	S,Em

**Course Name: Numerical Solution of Partial Differential Equations**

**Course Code: ME4213**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
<b>CO1</b>	Students should be able to understand application of finite difference method in one dimension PDE	3	S,Em
<b>CO2</b>	Students should be able to apply and solve parabolic equations for different boundary conditions	3	S,Em
<b>CO3</b>	Students should be able to solve hyperbolic equations for various boundary conditions	3	S
<b>CO4</b>	Students should be able to solve elliptical equations for different boundary conditions	3	S
<b>CO5</b>	Students should be able to know about finite element method for solving problems	3	S,Em

**Course Name Computational Fluid Dynamics**

**Course Code ME4205**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than
<b>CO1</b>	Students should be able to develop an understanding for the major theories, approaches and methodologies used in CFD.	3	S,Em
<b>CO2</b>	Students should be able to analyse the partial differential equation	4	S,
<b>CO3</b>	Students should be able to analyse discrete structures.	4	S
<b>CO4</b>	Students should be able to numerically solve the governing equations for fluid flow problems	4	S
<b>CO5</b>	Students should be able to analyse fluid flow and also able to do its modeling.	3	S

**Course Name Design of Heat Exchangers**

**Course Code ME4210**



Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurs hip (Emt)/ None (Use , for more than
<b>CO1</b>	Students should able to develop good understanding of the intricacies of heat exchanger design.	2	S,Em
<b>CO2</b>	Students should learn about the flow and stresses in heat exchanger	2	None
<b>CO3</b>	Students should aware about different design aspects of heat exchangers	2	Em
<b>CO4</b>	Students should gain knowledge of different heat exchanger in thermal power plant.	2	Em
<b>CO5</b>	Students should able to know the designing and optimization of heat excahnger	3	S

Course Name **Jet & Rocket Propulsion Systems**  
Course Code **ME4207**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurs hip (Emt)/ None (Use , for more than
<b>CO1</b>	Students should be able to understand working of various propulsion systems.	2	S,Em
<b>CO2</b>	Students should be able to understand the principles of jet propulsion and rocketry.	2	S
<b>CO3</b>	Students should be able to review the properties of mixture of gases and understand the solid propulsion system.	3	S
<b>CO4</b>	Students should be able to understand the liquid rocket propulsion system.	2	None
<b>CO5</b>	Students should be able to understand the ramjet propulsion system	2	none

Course Name **Gas Turbine and Compressors**  
Course Code **ME4208**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurs hip (Emt)/ None (Use , for more than
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<b>CO1</b>	Students should be able to develop Basic understanding of gas turbine and related working cycles	2	S,Em
<b>CO2</b>	Students should be able to understand designing concepts of gas turbines	3	S
<b>CO3</b>	Students should be able to understand velocity triangle and axial flow turbine	3	S
<b>CO4</b>	Students should be able to understand centrifugal compressor basics and their performance evaluation	3	S
<b>CO5</b>	Students should be able to understand the concept of degree of reaction for axial flow compressors.	2	S,Em

Course Name **New Venture Creation**  
Course Code **ME4211**

<b>Unit-wise Course Outcome</b>	<b>Descriptions</b>	<b>BL Level</b>	<b>Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than</b>
<b>CO1</b>	Understand entrepreneurship and entrepreneurial process and its significance in economic development.	3	En
<b>CO2</b>	Develop an idea of the support structure and promotional agencies assisting ethical entrepreneurship. .	2	En
<b>CO3</b>	Identify entrepreneurial opportunities, support and resource requirements to launch a new venture within legal and formal frame work.	3	En
<b>CO4</b>	Develop a framework for technical, economic and financial feasibility.	2	En
<b>CO5</b>	Understand the stages of establishment, growth, barriers, and causes of sickness in industry to initiate appropriate strategies for operation, stabilization and growth.	2	En

Course Name **Alternative Fuels**  
Course Code **ME4301**

<b>Unit-wise Course Outcome</b>	<b>Descriptions</b>	<b>BL Level</b>	<b>Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than</b>
<b>CO1</b>	Students should able to understand the basic concepts of IC engine	2	S,Em
<b>CO2</b>	Students should aware about the need of alternative fuel in different fields	2	S,Em
<b>CO3</b>	Students should able to understand and analyze the application of alcohol and biodiesel in IC engine	3	S



<b>CO4</b>	Students should be able to understand the application Hydrogen and biogas	2	None
<b>CO5</b>	Students should be able to apply the basics of chemistry in the preparation of biodiesel	2	S

Course Name **Solar Energy Technology**

Course Code **ME4302**

<b>Unit-wise Course Outcome</b>	<b>Descriptions</b>	<b>BL Level</b>	<b>Employability (Emp)/ Skill(S)/ Entrepreneurs hip (Emt)/ None (Use , for more than</b>
<b>CO1</b>	Students should be able to conceptual knowledge of the solar energy technology, economics and regulation related issues associated with solar power development and management.	2	Em
<b>CO2</b>	Students should be able to concentrating collector designs of solar energy technology, solar power plant; solar furnaces.	2	Em
<b>CO3</b>	Students should be able to solar heating and cooling system – of solar energy system.	2	S
<b>CO4</b>	Students should be able to solar cell physics variation of efficiency with band-; high efficiency cells, tandem structure of the solar.	2	S
<b>CO5</b>	Students should be able to develop a comprehensive technological understanding in solar pv system components.	2	S

Course Name **Modelling of IC Engine**

Course Code **ME4310**

<b>Unit-wise Course Outcome</b>	<b>Descriptions</b>	<b>BL Level</b>	<b>Employability (Emp)/ Skill(S)/ Entrepreneurs hip (Emt)/ None (Use , for more than</b>
<b>CO1</b>	Student will know about concepts and governing equations	3	S,Em
<b>CO2</b>	Student will know about heat release analysis and combustion models of CI engine	3	S
<b>CO3</b>	Student will know about reprocessing of nuclear fuel	2	S
<b>CO4</b>	Student will know about fuel spray behavior	2	S
<b>CO5</b>	Student will know about mathematical model of SI engine	3	S



Course Name **Energy Storage Techniques**

Course Code **ME4303**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurs hip (Emt)/ None (Use , for more than
<b>CO1</b>	Students should able to understand the energy storage systems	2	S,Em
<b>CO2</b>	Students should able to understand the working of battery storage systems	2	S
<b>CO3</b>	Students should able to understand the working of magnetic and electric storage systems	2	S
<b>CO4</b>	Students should able to understand the working of fuel cell and hydrogen storage systems	2	S
<b>CO5</b>	Students should able to understand the thermal storage systems	2	S,Em

Course Name **Energy Management in Thermal System**

Course Code **ME4305**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurs hip (Emt)/ None (Use , for more than
<b>CO1</b>	Students should be able to the course is intended to introduce principles of energy auditing and to provide measures for energy conservation in thermal applications	2	S,Em
<b>CO2</b>	Students should be able to design suitable energy monitoring system to analyz and optimize the energy consumption in an organization.	3	S
<b>CO3</b>	Students should be able to improve the thermal efficieny by designing suitable systems for heat recovery and co-generation.	3	S
<b>CO4</b>	Students should be able to guide the employees of the organization about the need and the methods of energy conservation.	2	S
<b>CO5</b>	Students will be able to carry out the cost- benefit analysis of various investment alternatives for meeting the energy needs of the organization.	3	S,Em

Course Name **Air-Conditioning System Design**

Course Code **ME4309**



Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurs hip (Emt)/ None (Use , for more than
<b>CO1</b>	Students should be able to estimate the solar radiation.	3	S
<b>CO2</b>	Students should be able to learn about the Solar Radiation fenestration, ventilation and infiltration.	2	S
<b>CO3</b>	Students should be able to learn about the Heat Transfer through building, fabric heat gain/loss.	3	S
<b>CO4</b>	Students should be able to sense about the Selection of Air Conditioning Systems	2	S
<b>CO5</b>	Students should be able to differentiate about the Transmission of Air in Air Conditioning Ducts	2	S,Em