Course Type	Course Code	Name of Course	L	T	P	Credit
DC	MEC203	Applied Thermodynamics	3	0	0	9

Course Objective

The course will give a brief overview of basic concept of Thermodynamics followed by applications of the Laws of Thermodynamics for understanding the different Thermodynamic cycles. The course will also focus on Steam generator, Steam turbine, Gas Turbine, Refrigeration cycles. The course has been designed taking into the need of fulfilling the further course like IC Engines, Power Plant Engineering and Refrigeration and Air conditioning.

Learning Outcomes

Upon successful completion of this course, students will:

- understand the basic requirements of Thermodynamics
- learn the different types of Steam generators, I C Engines, Steam Turbine and Gas Turbine
- be able to develop an in-depth understanding of Combustion of fuel

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	**Basic Thermodynamics:** Definition of Thermodynamics, thermodynamic system, open system, closed system and isolated system, surroundings, control volume, state point, properties, extensive and intensive properties, thermodynamic processes and cycles, thermodynamic equilibrium, Quasi-static process, concept of continuum, Different laws of Thermodynamics, 1st Law of Thermodynamics, 2nd Law of Thermodynamics, Steady flow energy equations, Carnot Theorem, Inequality of Clausisu, Internal Energy, enthalpy, Principle of Increase entropy.	6	Understanding of basic Thermodynamics
2	**Fuels and Combustion**: Types of fuels, calorific values of fuels and their determination, combustion equations, flue gas analysis, Orsat apparatus, excess air, determination of actual quantity of air from from combustion analysis	5	Understanding the pollutant in the exhaust gas and selection of good fuel based on Calorific value
3	**Steam generators:** Classification, study of fire tube and water tube boilers, Boiler mountings and accessories, boiler efficiencies, equivalent evaporation, Boiler draught, natural and artificial draught, forced, induced and balance draught	5	Knowledge of different types of boilers
4	Properties of a pure substance, p-v, p-T, T-s and h-s diagrams	4	Knowledge of quality of steam
5	Vapour Power Cycles: Carnot cycle, Rankine cycle, Reheat and Regenerative cycles, work, power, efficiency	6	Understanding about the vapour power cycles.

6	**Air standard cycles:** Otto cycle, Diesel cycle, Dual cycles, Stirling and Ericsson cycles, work, efficiency	4	Knowledge of theoretical air standar cycles
7	**Refrigeration cycles:**Vapour compression refrigeration cycle, COP	4	Understanding different methods of lowering the temperature of the ststems
8	**Gas Turbine:** open cycle and closed cycle gas turbine, Brayton cycle, work, power and efficiency	5	.Basic knowledge of Gas Turbine cycle used in jet engines
9	**Internal Combustion Engines:** 2-S and 4-S Diesel and Petrol Engines, Principles of working of 2- S and 4-S I C Engines.	3	Knowledge about 2-S and 4-S Petrol Engine ,and 4-S Diesel Engines

Text Books

1. Engineering Thermodynamics : P.K.Nag, Mc Hill Education(India) Pvt Ltd, New Delhi,Sixth edition (2017)
2. Thermodynamics-An Engineering Approach : Y A Cengal and M A Boles, Tata McGraw Hill

Reference Books:

1. Engineering Thermodynamics : C.P.Arora, Tata Mc Graw Hill
2. Fundamentals of Thermodynamics: Sonntag, B and Van Wylen, John