1.	Title of the course	Applied Thermal Engineering
2.	Course number	ME305L
3.	Structure of credits	3-1-0-4
4.	Offered to	UG
5.	New course/modification to	Modification To ME3202/8
6.	To be offered by	Department of Mechanical Engineering
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	**Course Objective(s):** To study the exergy analysis of a study flow process; To evaluate the performance of vapour power and gas power cycles; To investigate the ways to modify the basic cycles to increase the thermal efficiency; To introduce concepts of refrigeration and air-conditioning; To analyze vapor compression refrigeration system; To analyze various air-conditioning processes; To study the basic concepts related to fuels ans their combustion; To study one dimensional compressible fluid flows.	
10.	**Course Content:** Second law analysis for a control volume, irreversibility and availability, exergy balance equation and exergy analysis; Vapor power cyclesRankine cycle with superheat, reheat and regeneration, super-critical and ultra-supercritical Rankine cycle; Gas power cycles- IC engine cycles– air standard Otto, Diesel and dual cycle, gas turbines- air standard Brayton cycle, effect of reheat, regeneration and intercooling; Combined gas and vapor power cycles-vapor compression refrigeration cycles, vapor refrigeration systems and their analysis, commonly used refrigerants and their properties, supercritical vapor compression refrigeration cycles; Psychrometry-Introduction to psychrometric principles, application of mass and energy balances to air-conditioning systems, wet- and dry-bulb temperatures, psychrometric chart, air conditioning processes; Combustion-combustion reactions, stoichiometry, first law analysis, heat calculations, adiabatic flame temperature; Gas dynamics-basic ideas in compressible flow, normal shocks, flow of perfect gases through nozzles, flow of steam.	
11.	**Textbook(s):** 1. Eastop T D and Mcconny A, *Applied Thermodynamics for Engineering Technologists*, 5th Edition, Pearson (2002). 2. Moran M J, Shapiro H N, Boettner D D and Bailey M B, *Fundamentals of Engineering Thermodynamics*, 7th Edition, Wiley (2010).	
12.	**Reference(s):** 1. Babu V, *Fundamentals of Gas Dynamics*, 2nd Edition, CRC Press (2008). 2. Cengel Y and Boles M A, *Thermodynamics: An Engineering Approach*, 8th Edition, McGraw Hill (2014).	