INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
PROFORMA FOR NEW COURSE

1.	Title of the Course	Applied Thermal Engineering
2.	Course Number	ME3202
3.	Status of the Course	Core
4.	Structure of Credits	3-1-0-4
5.	Offered To	UG
6.	New Course/Modification to	New
7.	To be Offered by	Department of Mechanical Engineering
8.	To take effect from	July 2018
9.	Prerequisite	Nil
10.	Whether approved by the Department	Yes
11.	**Course Objective:** 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.	
12.	**Course Content:** Second law analysis for a control volume, irreversibility and availability, exergy balance equation and exergy analysis; Vapor power cycles- Rankine cycle with superheat, reheat and regeneration, super-critical and ultra-super-critical 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.	
13.	Text book(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).	
14.	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).	