

INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
PROFORMA FOR NEW COURSE

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| 1. | Title of the Course | Energy Conversion Systems |
| 2. | Course Number | ME4101 |
| 3. | Status of the Course | Core |
| 4. | Structure of Credits | 2-1-3-5 |
| 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 | |
| 10. | Whether approved by the Department | Yes |
| 11. | Course Objective: To learn fundamentals of various energy conversion systems; To learn thermodynamic analysis of IC engine cycles and processes; To learn various subsystems in IC engines; To learn analysis of turbo machine processes and components, application of first and second laws of thermodynamics to turbomachines; To learn analysis of refrigeration cycles and components, types of refrigerants, concepts of super heating and sub-cooling . | |
| 12. | Course Content: IC Engines: Evolution of IC engines; features of IC engines; Nomenclature; Classification; Construction and working of 2S, 4S, petrol and diesel engines; components of the IC engines, applications of IC engines; P-v diagrams; Details of the engine components, test parameters, combustion and emissions: Turbo Machines; Types, static and stagnation states and representation of expansion and compression processes in T-s/h-s plots, application of first and second laws of thermodynamics to turbomachines, velocity triangle, absolute and relative velocities, Euler equation for turbomachines, degree of reaction, losses and non-dimensional groups in turbomachines: Refrigeration- vapour compression refrigeration systems, review of refrigerants, actual cycles -superheating, sub-cooling; Lab component: Performance evaluation of CI and SI engines, performance study of pelton wheel, francis turbine, kaplan turbine and centrifugal pump, performance study of vapour compression refrigeration system and air conditioning system | |
| 13. | Text book(s): 1. Dixon S L and Hall C A, <i>Fluid Mechanics and Thermodynamics of Turbomachines</i> , 7th Edition, Butterworth-Heinemann (2010). 2. Stone R, <i>Introduction to Internal Combustion Engines</i> , 4th Edition, Palgrave Macmillan (2012). | |
| 14. | Reference(s): 1. Arora C P, <i>Refrigeration and Air-conditioning</i> , 3rd Edition, Tata McGraw-Hill (2008). 2. Ganesan V, <i>Internal Combustion Engines</i> , 4th Edition, Tata McGraw-Hill (2003). | |