

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY DESIGN
AND MANUFACTURING (IIITDM) KANCHEEPURAM

INTRODUCTION OF NEW COURSE

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| Course Title | Thermal Turbomachines | Course Code | | | | |
| Dept./ Specialization | Mechanical | Structure (LTPC) | 3 | 1 | 0 | 4 |
| To be offered for | UG / PG | Status | Core <input type="checkbox"/> | | Elective <input checked="" type="checkbox"/> | |
| Faculty Proposing the course | Dr S Karthick | Type | New <input checked="" type="checkbox"/> | | Modification <input type="checkbox"/> | |
| Recommendation from the DAC: 01-06-2021 | | Date of DAC | 01-06-2021 | | | |
| External Expert(s) | Prof S P Venkateshan | | | | | |
| Pre-requisite | Fluid Mechanics and Heat Transfer courses | | Submitted for approval | | 46 th Senate | |
| Learning Objectives | <ul style="list-style-type: none"> To understand the principles of turbomachines and apply them to design different types of turbo machinery components. | | | | | |
| Learning Outcomes | <ul style="list-style-type: none"> By completing this course, students will be able to design various thermal turbo machinery components such as compressors, turbines, pumps, fans and blowers by applying basic principles of turbomachinery. | | | | | |
| Contents of the course (With approximate break-up of hours for L/T/P) | <p>Recap of Fundamental Concepts: Compressible and incompressible flows. Steam turbine & cycles and gas turbine & cycles ,Thermodynamic analysis of expansions and its relevance in energy conversion. (L4/T1)</p> <p>Introduction to Turbomachines: Classification of Turbomachines, Basic Laws and Governing Equations, Energy Transfer in Turbomachines and Euler's, Dimensionless parameters, Specific speed, Blade Classification & Blade Terminology, Drag and Lift (L3/T1)</p> <p>Centrifugal and Axial Flow Compressor: Construction and Working, Velocity Diagram for Centrifugal and Axial Compressors, Degree of Reaction, Compressor Characteristics and performance Curves, losses, and Design considerations (L12/T4)</p> <p>Axial and Radial Turbines: Classification of Turbines, Energy Transfer analysis & Velocity Diagram for Axial Flow Turbines, Vortex Theory, Choice of Blade Profile, Pitch & Chord, and its Performance. Velocity Diagram and Elementary Theory for Radial Flow Turbines, Characteristic Curves for Turbines, Design considerations. (L11/T4)</p> <p>Pumps: Classification of Pumps, Construction and Working of Pumps, Centrifugal Pump Calculations, Elementary Theory of Pumps, Performance Characteristic Curves, Cavitation and Its Control, Miscellaneous Types of Pumps.(L6/T2)</p> <p>Fans And Blowers: Classification, flow analysis in blades & Diffusers, Fan Laws, Fan Characteristics, Design Considerations. (L6/T2)</p> | | | | | |
| Text Book | <ol style="list-style-type: none"> Yahya, S.H., Turbines, Compressor and Fans, 4e, Tata McGraw Hill Publishing Company, 2017. Onkar Singh, Thermal Turbomachines. 2e, Willey Publications, 2019 | | | | | |
| Reference Books | <ol style="list-style-type: none"> Earl Logan, Jr., Hand book of Turbomachinery, Marcel Dekker Inc., 1992. Ganesan, V., "Gas Turbines", Tata McGraw Hill Pub. Co., 1999. Cengel and Boles "Thermodynamics: An Engineering Approach" 8e, Tata McGraw Hill Publishing Company, 2017. | | | | | |