Pimpri Chinchwad Education Trust's
Pimpri Chinchwad College of Engineering
Sector No. 26, Pradhikaran,
Nigdi, Pune – 411 044

ISO 9001 Certified

COURSE OUTLINE

Department: Mechanical Engineering A.Y.:2021-22 Sem-I Date:25 Oct 2021
Class: TE Mechanical

Name of the Course: **Heat and Mass Transfer**

Relevance of the course:
The Heat and Mass Transfer is a branch of thermal science which deals with analysis of rate of heat and mass transfer as well as temperature distribution taking place in s system. The design of boiler, condenser, evaporator, heaters, refrigerators and all heat exchanger require the knowledge of amount of heat to be transmitted and rate of heat is to be transferred. The successful operation of equipment components such as turbine blades, the walls of combustion chamber, etc. depends upon cooling rate in order to avoid their metallurgical failure. A heat transfer analysis must also be accounted in the design of electronic components, electric machines, transformers, and bearings to avoid over heating and damage of equipment.
The following prerequisite are required

I. Engineering Mathematics
II. Engineering Thermodynamics
III. Fluid Mechanics

Course Outcomes

CO No	CO Statement	No. of Lectures Planned	No. of Practical planned	Content Delivery method	Assessment tools Planned
1.	ANALYZE & APPLY the modes of heat transfer equations for one dimensional thermal system.	8	2	Presentation, Lecture with Interaction, Quiz	Unit Test 1, Experiment No.1&2
2.	DESIGN a thermal system considering fins, thermal insulation and & Transient heat conduction.	8	1	Presentation, Lecture with Interaction, Quiz	Unit Test 1, Design Project-I, Quizzes
3.	EVALUATE the heat transfer rate in natural and forced convection & validate with experimentation results	8	2	Presentation, Lecture with Interaction	Unit Test 2, Design Project II, Quizzes
4.	EVALUATE & INTERPRET heat transfer by radiation between objects with simple geometries, for black and grey surfaces	6	4	Presentation, Lecture with Interaction	Unit Test 2, Quizzes
5.	ABILITY to ANAYZE the rate of mass transfer using Fick's Law of Diffusion and understands mass diffusion in different coordinate systems	7		Presentation, Lecture with Interaction	Theory Assignment 1, Quizzes

6.	DESIGN & ANALYSIS of heat transfer equipment and investigation of its performance.	6	2	Presentation, Lecture with Interaction, Quiz	Theory Assignment 2, Quizzes

Assignment:

Assignment Planned	CO Mapped	Tentative schedule
Assignment on Mass Transfer	CO 5	November Second Week
Assignment on Design of Heat Exchanger	CO 6	October Last week

Mini Project topics offered:
Electronic Cooling by using force convection or Electronic Cooling by using Heat Pipe
Industry visit/ Case studies planned:
Zois Charge Air Cooler, Bhivari, Saswad. Radiator and Air cooler manufacturer

Guest Lecture/ Co Teaching: A lecture on Mass Transfer will be arranged in November last week.

		
Course Faculty TE A Dr. C. L. Ladekar	Course Faculty TE B Mr. Sanjay Salve (Course Co-ordinator)	Course Faculty TE C Dr. Umesh Potdar