Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Technology and Science

Choice Based Credit System (CBCS) Scheme in light of NEP-2020

Generic Elective (Odd Semester)

(2021-2025)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MTMEGE101	GE	DOMESTICS AND INDUSTRIAL EQUIPMENTS	60	20	20	0	0	3	0	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:-

The primary objective of the course is to describe and develop knowledge of (A) Basic laws and knowledge of thermodynamics (B) Compressors, (C) Condenser and Evaporator, (D) Pumps, Fans, Blowers, and Heat Exchangers.

Course Outcomes:-

After completion of this course the students will be able to describe the followings:

1. Students will be able to understand & describe concepts of compressors.
2. Students will be able to describe the condenser and evaporator.
3. Students will be able to describe the principles of pump and fans.
4. Students will be able to understand the working principles of Heat exchangers

Syllabus

Unit-I **(9Hrs)**

Introduction: Basic laws of fluid, First Law of Thermodynamics, Second Law of Thermodynamics, Thermodynamic equilibrium, Thermodynamic analysis of Gas turbine power cycles – Joule/Brayton. Open and Closed Cycles. Methods of improving cycle efficiency – Intercooling. Reheating and Regeneration.

Unit-II **(8Hrs)**

Compressor: Various components and their functions. Types and classification of compressors. Characteristics of the compressors, Constructional details and working of reciprocating, rotary, centrifugal, screw, scroll compressors, Selection of compressors for different applications, capacity control and performance comparison.

Unit-III

(9Hrs)

Condenser and Evaporator: Types and working of different condensers, Air cooled condensers, Water cooled condensers - shell and tube, shell and coil, double pipe, evaporative – Heat transfer estimation – Selection and application - fouling factors and factors affecting

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condenser performance. Types of evaporators, DX, flooded, finned, plate, falling film – heat transfer estimation – selection and application, factors affecting evaporator performance

Unit-IV: **(10Hrs)**

Pumps, Fans and Blowers: Various components and their functions, Types and classification of Pump, Head Requirement, Operation and Performance issues, Types of pumps, Types of Fan including ventilation, Selection of fan for various applications, Power, Efficiency, Motor sizing, Noise level, Static pressure, operation and performance issues, Centrifugal Blowers: Theoretical characteristic curves - Euler's characteristics and Euler's velocity triangles, losses and hydraulic efficiency , flow through impeller inlet volute, diffusers - leakage disc friction mechanical losses, multi-vane impellers of impulse.

Unit-V **(7Hrs)**

Heat Exchangers: Parallel flow, counter flow and cross flow heat exchangers, multi-pass shell and tube heat exchangers. Plate type of heat exchangers and Compact Heat Exchangers.
Power plant heat exchangers:,. Principles of simultaneous heat and mass transfer. Analysis of cooling towers. Case studies of heat transfer related problems in Power Plant Boilers and Turbines.

Reference Books:

1. S.M. Yahya, " Fundamentals of Compressible Flow ", New Age International Pvt. ltd,1996.
2. Stepan off A.J. John, "Turbo blowers", Wiley & Sons, 1970
3. Dixon, Fluid Mechanics, "Thermodynamics of turbomachinery", Pergamon Press, 1984
4. Frank Kreith and S. Bohn, "Principles of Heat Transfer", Harper and Roks Publishers, New York 1986
5. Glen Myers, "Analytical Method in Conduction Heat Transfer", McGraw Hill co., 1971.

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6. W.M. Kays, "Convective Heat and Mass Transfer", Tata McGraw Hill Publishing Co. Ltd., 1979.
7. J.P. Holman, "Heat Transfer", McGraw – Hill Book Co., 1992.
8. Kern, D.Q., "Process Heat Transfer", McGraw Hill, 1950.
9. Gopalakrishnan G, Prithvi Raj D, "A treatise on Turbomachines", Scitec Publications, Chennai, 2002.

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