

Course Code TEE 803	Credit Hours (Th-Pr) 3-0	Conventional and Renewable energy Power Plants (core)	Contact Hrs/Week (Th-Pr) 3-0	Total Contact Hrs (Th-Pr) 45-0
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Course Outline:

Steam power plants

Gas turbine and combined-cycle power plants

Diesel- and gas-engine power plants

Nuclear power generation

Eligibility Criteria:

CHP systems

Solar thermal power plants

Geothermal power plants

Eligibility Criteria

B.E in Mech., Elect (Power), Chemical, Industrial, Process

B.S (4-years) Or M.Sc. degrees in Physics

Recommended Books:

S. No.	Title	Author(s)	Assigned Code	Remarks
1.	POWERPLANT TECHNOLOGY	M. M. El-Wakil	WM	Text Book
2.	Thermal Power Plant Performance Analysis	De Souza, Gilberto Francisco Martha	SD	Reference
3.	Geothermal Power Plants	Ronald DiPippo,	RD	Reference
4.	Steam Plant Operation	Everett Woodruff, Herbert Lammers	EW	Reference
5.	Power Generation	Paul Breeze	PB	Reference

	Technologies			
6.	Solar Electric Power Generation - Photovoltaic Energy Systems	Krauter, Stefan C. W.	SK	Reference
7	Introduction to Nuclear Engineering	John R. Lamarsj	JL	Reference

Course Objectives:

Understanding of the principles of operation, configuration, characteristics, and key implementation issues of various types of power plant including renewable energy thermal power plants.

Learning outcome:

On successful completion of the module the student will be able to:

- a. Recognize and demonstrate a comprehensive understanding of the fundamentals and laws governing energy conversion
- b. Debate issues related to the performance of conventional power-generation plants
- c. Propose appropriate technologies for improving energy-utilization efficiency of power-generation plants
- d. Assess the need of a particular industrial/commercial site for a CHP system, identify the appropriate systems and undertake design, sizing and economic analyses
- e. Review critically technologies employed for fuel-cell systems and advances in their applications
- f. Continue to advance their knowledge and assimilate new future technologies.

Topics Covered:

No.	Topics	Book	Contact
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1.	<p>Steam power plants:</p> <ul style="list-style-type: none"> • Thermodynamic principles. Fuels. Steam power generation cycles. Steam Generators, Steam turbines <p>Gas turbine and combined-cycle power plants:</p> <ul style="list-style-type: none"> • Gas turbine engines and performance. Gas turbine cycles. Combined cycle power plants. <p>Diesel- and gas-engine power plants:</p> <ul style="list-style-type: none"> • Diesel engines. Fuels. Emission control. Heat recovery systems. 	WM, SD& EW	12
2.	<p>Nuclear power generation:</p> <ul style="list-style-type: none"> • Basic nuclear physical processes (fission and fusion). Nuclear fuels. • Types of reactors. Safety considerations in the nuclear industry. Developments in nuclear fusion. • Decommissioning problems of nuclear sites. Nuclear-waste disposal systems. 	JL, WM	9
3.	<p>CHP systems:</p> <ul style="list-style-type: none"> • CHP schemes (micro-scale CHP systems, small scale CHP systems, large scale • CHP systems including district heating schemes). Application of CHP systems for the provision of heating, cooling, and electric power. • Selection criteria of CHP prime-movers. Integration of CHP systems into site services. • Feasibility analysis of CHP schemes using spreadsheets/software tools. • Case study (site appraisal for CHP scheme and evaluation of economic and environmental viability). 	WM	10

4	Solar thermal Power Generation <ul style="list-style-type: none"> • Selection of Site and Data Requirements • Solar radiations and their conversions • Modeling of System Components • Validation of Model and System Design • Thermal Energy storage for solar thermal power generation systems • Economic consideration 	SK	9
5	Geothermal power generations Systems	RD	5