

Course Code TEE-814	Credit Hours (Th-Pr) 3-0	Environmental Issues of fossil fuel power plants (Core)	Contact Hrs/Week (Th-Pr) 3-0	Total Contact Hrs (Th-Pr) 45-0
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Course Outline:

- Overview of the environmental issues due to the thermal power generation system
- Atmospheric pollution due to thermal power plants (Types)
- Environmental impacts of atmospheric pollution due to thermal power plants
- Control techniques of atmospheric pollution
- Global warming and Greenhouse Effect due to Power plants
- Modelling of Environmental processes
- Water pollutants due to thermal power plants
- Solid waste management
- Environmental law and legislation
- Environmental impact assessment

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.	Engineering and Environment	Edward. S. Rubin	ER	Text Book
2.	Energy and the Environment	Robert Ristinen	RR	Reference
3.	FUELS, ENERGY, AND THE ENVIRONMENT	Ghazi A. Karim	KG	Reference

Course Objectives:

Full appreciation of the human impact on the environment and updated knowledge of pollution control equipment and environmental management systems and tools.

Learning outcome:

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

- Recognize the complexity of environmental issues faced due to the thermal power generation
- Identify the emissions of atmospheric and water pollutants from a power generation activity and assess their environmental impacts
- Appraise critically available pollution control technology/equipment in order to make a successful selection of the most appropriate and viable option for a given application
- Make sound judgment in the absence of complete data and communicate effectively conclusions obtained
- Continue to advance their knowledge and assimilate new future technologies.

Topics Covered

No.	Topics	Book	Contact Hours
	Introduction to Energy and Environment <ul style="list-style-type: none">• Sources of energy• Renewable and non-renewable energy resources• Economics of energy production and consumption• Global Politics and Strategies• Making global and local decisions on the structure of utilized energy sources Global Energy Use and Supply <ul style="list-style-type: none">• Renewable resources and fossil fuels• Hydraulic, geothermal, wind, tidal, solar, biomass energies• Oil, gas, coal, and oil shale energy production• Environmental consequences of the fossil fuels production and utilization	ER ,RR&K G	8
	Thermodynamic Principles of Energy Conversion <ul style="list-style-type: none">• Flue gases	ER ,RR&K	12

	<ul style="list-style-type: none"> • NOx formation and reduction • Combustion emission control • Thermodynamic fundamentals • Natural gas combustion • Coal combustion • Estimating steam power <p>Different fuels and environmental effects due to their combustion</p> <p>Electrical Energy Generation, Transmission, and Storage</p> <ul style="list-style-type: none"> • Electric Power Transmission • Energy Storage • Properties of Energy Storage <p>Alternative Fuels and Advanced Technologies (Renewable Energy)</p> <ul style="list-style-type: none"> • Liquefied petroleum gas • Compressed natural gas • Methanol fuel • Ethanol fuel • Hydrogen fuel • Reformulated gasoline (RFG) • Fuel cells • Environmental effects of fuel cells 	G	
	<p>Environmental Effect of Fossil Fuels Combustion</p> <ul style="list-style-type: none"> • Atmospheric warming • Acids deposition • Coal ash treatment • Waste management <p>Nuclear Energy</p> <ul style="list-style-type: none"> • Fundamentals of nuclear power • Nuclear power systems • Comparing fission and fusion energies • Nuclear power health effects • Safety requirements for nuclear power plants 	ER ,RR&K G	7

	<ul style="list-style-type: none"> Radioactive waste management and disposal 		
	Global Climatic Changes <ul style="list-style-type: none"> Greenhouse gasses Greenhouse effect Characteristics of the present-day atmosphere Key points of the adiabatic theory Prognostic atmospheric temperature estimates Impact of anthropogenic factor on the Earth's climate Influence of the World Ocean on the atmospheric content of carbon dioxide 	ER ,RR&K G	4
	Global Forces of Nature Driving the Earth's Climate <ul style="list-style-type: none"> Solar irradiation reaching the Earth Orbital deviations and the Earth's mass redistribution The Earth's degassing Global climatic cooling due to increase in atmospheric carbon dioxide content Inner sources of the Earth's energy World Ocean Microbial activity at the Earth's surface Global warming or global cooling 	ER ,RR&K G	4
	Global Environmental laws and legislation Introduction to environmental impact assessment Topics in Environmental Policy and Analysis	ER ,RR&K G	10