

Course Code : ME 722

Course Title : Thermal Power Plants

Credit Hours : 3

Course Description

Introduction to thermal power plants and the energy production challenges, Steam generator design specifications, Arrangement of Burners, Wind boxes and heating surfaces arrangement, Evaporative and convective heat exchangers design, Steam turbines components and operation modes, Advances in Material Technology, Advanced gas turbine design, Cooling techniques and gas turbine stall, Different kinds of combined cycles, Design of waste heat recovery boilers, Advanced combined cycle systems, Combined cycles retrofitting.

Course Objectives

The student should acquire the state of the art of thermal power plants and power plants strategies

Understand the scientific principles of power plant component design.

Acquire the state of the art of thermal power plant design strategies and evolving technologies.

Use efficiently mathematical models and computer software related to power plant components design

Aware of current power plant design practice and its limitations and environmental impact.

Course Topics

- Week no. 1: Introduction to thermal power plants and the energy production challenges
- Week no. 2: Steam generator design specifications.
- Week no. 3: Arrangement of Burners, Wind boxes and heating surfaces arrangement
- Week no. 4: Evaporative and convective heat exchangers design
- Week no. 5: Steam turbines components and operation modes
- Week no. 6: Advances in Material Technology.
- Week no. 7: Advanced gas turbine design / 7th week evaluation.
- Week no. 8: Advanced gas turbine design
- Week no. 9: Cooling techniques and gas turbine stall
- Week no. 10: Different kinds of combined cycles.
- Week no. 11: Design of waste heat recovery boilers
- Week no. 12: Design of waste heat recovery boilers / 12th week evaluation
- Week no. 13: Advanced combined cycle systems

Week no. 14: Combined cycles retrofitting.

Week no. 15: Presentation on selected topics.

Week no. 16: Final Examination

References

- Modern Power Station Practice (8 volumes).
- Central Electricity Generating Board - Pergamon Press LTD.
- The NALCO guide to boiler failure analysis.