



AL IMAM MOHAMMAD IBN SAUD ISLAMIC UNIVERSITY
COLLEGE OF ENGINEERING
Department of Mechanical Engineering

Course Information	
Course Code and Name:	ME 442 Power and Desalination Plants
Credit Hours:	3 (3 Lecture + 1 Tutorial)
Prerequisites:	ME 323 Thermodynamics 2

Course Description
First and second law analysis of steam and gas turbine cycles. Availability analysis. Steam Power Plants. Steam Generation Systems. Boiler Components and Auxiliaries. Steam Turbines. Turbine Applications Condensers and Feed Heater Designs. Scale Formation and Prevention. Single and multi-effect boiling desalting systems. Multistage flash desalination. Vapor compression systems.

Textbook			
Title	Power Plant Technology		
Authors	M.M El-Wakil		
Publisher	McGraw Hill	Year and Edition	2009 Edition.

Course Contents
Introduction (Energy sources; Types of power plants and Thermodynamics review)
Analysis of Steam Cycles (Carnot and Rankine cycles; Reheating of steam; Regenerative feedwater heaters and Efficiencies in a steam power plant)
Fuels and Combustion (Types of fuels; Air-fuel ratio; Heat of combustion and Heating values)
Steam Generators (Basic types of steam generators; The economizers; superheaters and reheaters; Boiler circulation and Boiler efficiency)
Steam Turbines (Flow through nozzles; Types of steam turbines; Velocity diagrams; Turbine governing and control and Power and efficiency in steam turbines)
Diesel Engine and Gas Turbine Power Plants (Types of diesel plant; Advantages and disadvantages of diesel engine power plant; Performance characteristic of diesel engine power plant; Gas turbine power plant; Components of gas turbine power plants and Gas turbine fuels and materials)
Combined Cycle power plant (Binary vapor cycles; Coupled cycles; Combined gas turbine - steam turbine power plants and Combined cycle plants for co-generation)
Condensers, Feedwater and Circulating Water Systems (Direct contact condensers; Surface condensers; Feed water heaters; Circulating water systems used in steam power plant; Cooling towers and Cooling towers calculations)
Introduction to desalination plants (Definitions and facts; Resources and Need for Water Desalination; Sea water desalination Methods and Thermal and Membrane desalination processes)

Academic Coordinator	Signature
Dr. Syed Muhammad Fakhir Hasani	



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