Power Stations
COURSE SYLLABUS

Course Code	Course Name	Credits	Contact Hours
0401580	Power Stations	3	3 T

INSTRUCTOR/COORDINATOR	
Name	Dr.Talal Aljaafreh
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TEXTBOOK	
Title	Power Generation Handbook : Selection, Applications, Operation, Maintenance
Author/Year	Philip Kiameh, 2019
Other Supplemental Materials	
Title	Power generations technologies
Author/Year	Paul Breeze, 2014
Electronic Materials	

SPECIFIC COURSE INFORMATION

A. Brief Description of the Content of the Course (Catalog Description)

Introduction: energy and power; conservation of energy, and forms of energy; theory of heat engines and the laws of thermodynamics; heat engines; heat transfer: conduction, convection and radiation; comparison of energy content and efficiency of different fuels; use of energy in society; coal, oil and gas power stations; nuclear energy; hydroelectricity; solar energy; advantages and disadvantages of different methods of generating electricity.

B. Pre-requisites (P) or Co-requisites (C)

None

C. Course Type (Required or Elective)

Compulsory

SPECIFIC GOALS

A. Specific Outcomes of Instruction

CLO1- The student should understand the basic energy conversion methods and techniques [1].

CLO2- The student should be able to distinguish the different types of power stations based on the principle of operation [1].

CLO3- The student should be able to analyze the dynamic operation of the various power station using the proper table sheets and charts **[7]**

CLO4- The student should be able to analyze the economics of different power stations and in particular renewable energy stations [7].

Fifth : **Course Plan Distribution**

B. Student Outcomes Addressed by the Course

1	2	3	4	5	6	7				
✓						✓				

BRIEF LIST OF TOPICS TO BE COVERED

List of Topics	No. of Weeks	Contact Hours
Review of some thermodynamic principles: First and second laws of thermodynamics, perfect and imperfect gases, vapors, reversibility, Carnot cycle.	1	3
Open and closed systems, energy types, entropy, enthalpy, process and cycle, P-V and T-s diagrams, Fuels and combustion	2	6
The Rankine cycle: The ideal Rankine cycle, superheat, reheat, regeneration, feedwater heating, open contact feedwater heaters, closed type feedwater heaters, Cogeneration.	2	6
Gas turbine and combined cycles: Gas turbine cycles, the ideal Brayton cycle, the nonideal Brayton cycle, combined cycles.	2	6
Principles of nuclear energy: The atomic structure, chemical and nuclear reactions, energy from nuclear reactions, nuclear fusion and fission, radioactivity, decay rate and half-lives, fission reactor types	2	6
Hydero- electric plants: Water power, advantages of hyder-electric plants, hydrology, site selection of hydro-electric plants, classification of hydro-electric plants, hydraulic turbines.	2	6
Power plant economics: Cost of electrical energy, capital cost of plants, operating cost, effect of load factor on unit energy cost, fixed and operating costs of steam plants, hydro- plants, and nuclear plants, electricity cost reduction.	2	6
Total	*15*	*45*

EVALUATION		
Assessment Tool	**Due Date**	**Weight (%)**
Mid Exam	According to the university calendar	30
Course Work (Homeworks, Quizzes, Projects, …etc.)	One week after being assigned	20
Final Exam	According to the university calendar	50

ABET's Students Learning Outcomes (Criterion # 3)

	Relationship to program outcome	
ABET 1-7		
1.	✓	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2.		an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3.		an ability to communicate effectively with a range of audiences.
4.		an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5.		an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6.		an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7.	✓	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.