



Course Specification

(Bachelor)

Course Title: : Power Plants
Course Code: ME 4247
Program: Bachelor of Mechanical Engineering
Department: Mechanical Engineering
College: Engineering and Architecture
Institution: Umm Al Qura University
Version: <i>Course Specification Version Number</i>
Last Revision Date: 29 December 2024

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A. General information about the course:

1. Course Identification

1. Credit hours: (.....)

2. Course type

- A. ☒ University ☐ College ☐ Department ☐ Track ☐ Others
B. ☒ Required ☐ Elective

3. Level/year at which this course is offered: (Level 14/ fifth year)

4. Course General Description:

The course considers the details of the steam power plants. It includes the study of the plant's economics and performance. It considers the power plant elements, steam generator, steam turbines, steam condensers, pumps and heat exchangers. Each element takes a considerable consideration during the course in both lectures and assignments. In addition to improvement of the plant, efficiency is included. The combined gas-steam cycles are also considered.

5. Pre-requirements for this course (if any):

Heat Transfer Equipment
Fluid Machinery

6. Co-requisites for this course (if any):

7. Course Main Objective(s):

To understand the fundamental of power plants engineering to generate power through main applications such as steam power generation, steam analysis, thermal power cycles.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	35	100%
2	E-learning		
3	Hybrid Traditional classroom		





No	Mode of Instruction	Contact Hours	Percentage
	• E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	
3.	Field	5
4.	Tutorial	
5.	Others (specify)	
Total		30

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Understanding different power generation systems, management and economics	K1	Presenting the knowledge using data show, and solve problems with participation and discussion.	Exams, project, presentation and survey
1.2	Study of the cycles of steam and combined plants and their performance improvements	K1	Presenting the knowledge using data show, and solve problems with participation and discussion.	Exams, project, presentation and survey
1.3	Study of the steam generators technology and function	K1	Presenting the knowledge using data show, and solve problems with participation and discussion.	Exams, project, presentation and survey
1.4	Analysis of the steam turbines and performance.	K1	Presenting the knowledge using data show, and solve problems with participation and discussion.	Exams, project, presentation and survey





Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			discussion.	
2.0	Skills			
2.1	Ability to apply knowledge of mathematics, chemistry, and engineering.	S1	Presenting the knowledge using data show, and solve problems with participation and discussion.	
2.2	Ability to design an engine or some parts or systems to meet desired needs within realistic constraints such as environmental, and safety, manufacturability, and sustainability.	S1	Presenting the knowledge using data show, and solve problems with participation and discussion.	
2.3	Ability to identify, formulate, and solve engineering problems relating to engine design and operation	S1	Presenting the knowledge using data show, and solve problems with participation and discussion.	
2.4	Ability to write and design small scale power plant generation.	S1	Presenting the knowledge using data show, and solve problems with participation and discussion.	
3.0	Values, autonomy, and responsibility			
3.1	Ability to understand of professional and ethical responsibility.	V1		
3.2	Ability to obtain knowledge of contemporary issues.	V3		
3.3	Ability to communicate effectively.	V2		

C. Course Content

No	List of Topics	Contact Hours
1.	Economics of power generation	5
2.	Analysis of steam cycle	5



3.	Combined cycle power Generation	5
4.	Steam generators	5
5.	Steam turbine	5
6.	thermal design of steam condenser	5
Total		30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Home works	12	10
2.	Report	12	10
3.	Midterm exam	7	30
4.	Final exam	Exam period	50

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Power plant Engineering
Supportive References	Thermodynamics An Engineering Approach – P KNAG
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom- visiting power plant generation
Technology equipment (projector, smart board, software)	Projector – Blackboard
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching		
Effectiveness of		



Assessment Areas/Issues	Assessor	Assessment Methods
Students assessment		
Quality of learning resources		
The extent to which CLOs have been achieved		
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	

