

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al-Anbiyaa College of Advanced Technologies Department of Refrigeration and Air Conditioning Techniques Engineering	
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Power Plants		Module Delivery
Module Type	C		☐ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	HVAC402		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level	4	Semester of Delivery	
Administering Department	BSC-HVAC	College	Advanced Technologies
Module Leader	Audai Hussein	e-mail	audai.Hussein@uowa.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	PhD.
Module Tutor	None	e-mail	E-mail
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	31/06/2026	Version Number	1

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	MPAC203	Semester	L2
Co-requisites module		Semester	L3

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims	1- Introduce the student to the basic processes of power cycles. 2- Identifying the properties of steam from tables and the processes that take place on the steam power plants cycle. 3- Learn about the different parts of the steam power plants and how it working. 4- Learn about the calculation the performance of each part of the steam power plants and the accessories.
Module Learning Outcomes	Upon completion of the course, students should be able to: 1- The student will be able to complete basic operations calculations on the steams cycles. 2- The student will be able to understand the thermal processes. 3- The student will be able to understand all types of boilers and fuels. 4- The student will be able to understand and calculate all performance which used in power plants.
Indicative Contents	Indicative content includes the following. *In the fourth week, outside the students' commitments, a scientific trip to a steam station (1) to see the parts of the system and how it works in reality, and to make a report [8 hrs].

	*In the eighth week, outside the students' commitments, a scientific trip to a gas power station (1) to see the parts of the system and how it works in reality, and to make a report .[8 hrs]
	*In the Twelfth week, outside the students' commitments, a scientific trip to a steam station (2) to see the parts of the system and how it works in reality, and to make a report .[8 hrs]
	*In the Fifteenth week, outside the students' commitments, a scientific trip to a thermal machinery repair plant to see the parts of the system and how it works in reality, Or showing scientific films about repairing thermal machines and steam turbines and to make a report .[8hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Assessment is based on hand-in assignments, written exam, Case study, Quizzes, seminars, Practical testing and Online testing.
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كلية وارث الأنبياء
COLLEGE OF ADVANCED TECHNOLOGIES

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem)	144	Structured SWL (h/w)	10
Unstructured SWL (h/sem)	56	Unstructured SWL (h/w)	2
Total SWL (h/sem)	200		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	20% (20)	3,5,6,10	LO #1,2,.....10
	Assignments	2	10% (10)	7, 8	LO # 8
	Seminar	1	10% (10)	11	LO # 11
Summative assessment	Midterm Exam	2 hr	10% (10)	12	LO # 1-12
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري محتوى كل اسبوع يجب ان يغطي الوقت المحدد	
Week	Subject
1	Introduction to power cycles and main equations in thermodynamics..
2	Power Plant Steam Cycles, Main Cycles.
3	Carnot cycle and its efficiency and all performance.
4	Steam table and its calculations.
5	Ideal Rankine cycle and colocations its performance.
6	Reheat cycle.
7	Regenerative cycle with open feed water heater.
8	Regenerative cycle with closed feed water heater.
9	Introduction to Heat Exchangers, Theoretical Principles, Parallel Flow H.E., Counter Flow H.E, Cross Flow H.E, The Log Mean Temperature Difference Method, The NTU Method, Shell and Tubes H.E., Condensing, Evaporation..
10	Combustion and Fuels, Complete and Incomplete Combustion, Correct Air/Fuel Ratio, Access Air Supplied, Heat Generation, Boiler Efficiency, pinch principle.
11	Steam Boilers, Kinds, Burners, Air Preheated, Preheated and Superheated, Combustion and Fuels, Complete and Incomplete Combustion, Correct Air/Fuel Ratio, Access Air Supplied, Heat Generation, Boiler Efficiency, pinch principle.
12	Steam Nozzles, Applications, Steam Expansion, Discharge, Velocity of Steam Through Nozzles, Values of Critical Pressure, Diameters of Throat and Exit for Maximum.
13	Steam Condensers, Kinds, Direct Contact Condensers, Surface Condenser, Design and Manufacturing.

14	Steam Turbines, The Kinds, Impulse Turbine, Blades Efficiency, Reaction Turbine, Reaction Ratio, Installation, Multi Stage Blades,
15	The Pumps, Kinds of Pumps, System Characteristics, Pumps Characteristics, Matching Pumps to System Characteristics, Operation of Pumps in series and Parallel, Performance of the Condensers. Applications

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الأسبوعي للمختبر

	Material Covered
Week 1	Feed water treatments .
Week 2	Fuel .
Week 3	The burner.
Week 4	The boiler.
Week 5	The quality calculation.
Week 6	The condense system part 1.
Week 7	The condense system part 2.
Week 8	The efficiency calculation for cycle.
Week 9	The turbine .
Week 10	The efficiency of the turbine .
Week 11	Bryton cycle .
Week 12	Efficiency of the Bryton cycle.
Week 13	Centrifugal pump.
Week 14	Axial pump.
Week 15	The effectiveness of the heat exchanger.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Recommended Texts	➤ 1-Dr. Rahim K. Jassim "POWER PLANT ENGINEERING and ECONOMY"2010 ➤ 2-Nag, P. K., "Power Plant Engineering", (2002) Tata-McGraw Hill. Higher Education, 2nd edition. ➤ 3-Kotas, T. J. (1995) "The Exergy Method of Thermal Plant Analysis", reprinted, Malabar, Florida, USA: Krieger.	yes

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

استاذ المادة: ا.م.د. عدي حسين

التاريخ: 31-8-2026

العميد: ا.م.د. علي باسم
محمد

رئيس القسم: ا.م.د. محمد حسن عبود

التاريخ: 31-8-2026