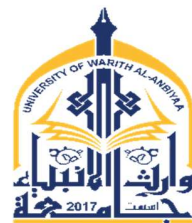




Ministry of Higher Education and
Scientific Research - Iraq
University of Warith Al-Anbiyaa
College of Sciences
Department of Medical Physics



MODULE DESCRIPTION FORM

Module Information					
معلومات المادة الدراسية					
Module Title	Heat and Thermodynamics		Module Delivery		
Module Type	Basic		Method	h/week	Frequency
Module Code	MPH2021		Theory	2	14
ECTS Credits	6 ECTS		Lecture	Choose an item.	Choose an item.
SWL (hr/sem)	150		Lab	2	15
			Tutorial	Choose an item.	Choose an item.
			Practical	Choose an item.	Choose an item.
			Seminar	Choose an item.	Choose an item.
Module Level	UG II	Semester of Delivery	3ed Semester		
Administering Department	MPH	College	CoS		
Module Leader	Ismail Muhammad Al-Desouki	e-mail	Ismail.M@uowa.edu.iq		
Module Leader's Acad. Title	Lecturer Doctor	Module Leader's Qualification	Ph.D.		
Module Tutor	Ayman Mohammed Jabr Safaa Mohammed Reda	e-mail	ayman.mo@uowa.edu.iq		
Peer Reviewer Name		e-mail			
Scientific Committee Approval Date	Click or tap to enter a date.	Version Number	1.0		

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	None
Co-requisites module	None	Semester	None



Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	<ol style="list-style-type: none">1. Providing the student with knowledge of the system and laws of thermodynamics.2. Providing the student with knowledge of heat, temperature, and heat capacity.3. Providing the student with knowledge of temperature measurement methods and systems.4. Providing the student with knowledge of the relationship between types of heat capacities and how to measure and calculate them.5. Providing the student with knowledge of the three laws of thermodynamics.6. Providing the student with knowledge of the methods and laws of heat transfer.7. Providing the student with knowledge in the operation of the refrigerator and heat pump.8. Providing the student with knowledge of the various gas laws and the ideal gas.9. Providing the student with experience in energy conversions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>Important: Write at least 6 Learning Outcomes, better to be equal to 10.</p> <ol style="list-style-type: none">1. -Introducing the student to the distinction between the properties of different gases and the laws that govern the relationships between them.2- Introducing the student to the factors affecting the behavior of gases.3- Introducing the student to the possibility of converting matter into energy.4- Introducing the student to the operations that can be performed on different gases.5- Introducing the student to temperature scales and how to convert between them.
Indicative Contents المحتويات الإرشادية	<p><u>Learning concepts of each theoretical lecture or groups of lectures. [SSWL= 28hrs]</u></p> <p><u>Lab. Lectures</u></p> <p><u>Learning concepts of each laboratory lecture or groups of lectures. [SSWL=30 hrs]</u></p> <p><u>Mid Exam =1hrs</u></p> <p><u>Final Exam =3hrs</u></p> <p><u>Total hrs = 62</u></p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<ol style="list-style-type: none">1- General and qualifying transferable skills (other skills related to employability and personal development).2- The ability to analyze, deduce and describe.3- To understand and comprehend the laws of energy conversion and transfer.4- Providing scientific material that relates to the scope of their work and is specialized as a medical physics department.se the strategy from the attached word file.
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Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	62	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.13
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	88	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.87
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation																											
تقييم المادة الدراسية																											
	Time Number	Weight (Marks)	Week Due													Relevant Learning Outcome											
			W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10
Formative	Quizzes	2	10%				X				X									X		X					
	Report	1	5%					X													X	X					
	Lab Report	1	5%										X								X						
	Project	-	-																								
	Online Assig.	2	10%						X			X								X							
	Onsite Assig.	1	10%																			X					
	Seminar	-	-																								
Summative	Mid. Exam	1hr	10% (10)						X																		
	Final Exam	3hr	50% (50)	Week 16													X	X	X	X	X						
Total assessment			100%																								

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Thermodynamics and Thermodynamic Concepts
Week 2	Behavior of Gases, Ideal and real gas
Week 3	Zeroth Law of Thermodynamics, Temperature and Temperature scales
Week 4	First Law of Thermodynamics
Week 5	Heat capacities of Ideal gas
Week 6	Heat Engines and second law of thermodynamic
Week 7	Mid. Exam
Week 8	Heat Pumps
Week 9	The Carnot Engine, Internal Combustion engine
Week 10	Entropy and Second Law of Thermodynamics
Week 11	Entropy and Performance of Heat Engines
Week 12	Third Law of Thermodynamics
Week 13	Maxwell's Relations, Cyclic rule, Applications of Maxwell's Relations
Week 14	Phase Transitions
Week 15	First order phase changes

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Find heat capacity of calorimeter
Week 2	Find volumetric expansion coefficient of liquid
Week 3	Find longitudinal expansion coefficient of metal
Week 4	Joule equivalent
Week 5	Find the latent temperature of melt ice
Week 6	Find specific heat of rigid body
Week 7	Find energy by using current and voltage
Week 8	Find heat capacity of calorimeter
Week 9	Find volumetric expansion coefficient of liquid
Week 10	Find longitudinal expansion coefficient of metal
Week 11	Joule equivalent
Week 12	Find the latent temperature of melt ice
Week 13	Find specific heat of rigid body
Week 14	Find energy by using current and voltage
Week 15	Find energy by using current and voltage

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Fundamentals of Thermodynamics, by claus borgnakke Richard e. Sonntag	Choose an item.
Recommended Texts	Thermodynamics: Principles and Applications, by Frank C. Andrews Year, Publisher.n,	Choose an item.
Websites	https://www.google.iq/books/edition/Thermodynamics_Principles_and_Applicatio/LOZpxJH0HeMC?hl=en&gbpv=1&bsq=thermodynamics+principles+and+applications+by+frank&dq=thermodynamics+principles+and+applications+by+frank&printsec=frontcover	

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.