MODULE DESCRIPTION FORM

Module Information

Module Title	Heat and Thermodynamics	**Module Delivery**	
Module Type	Basic		☒Theroy Lab
Module Code	MPH2021		
ECTS Credits	6		
SWL (hr/sem)	150		

Module Level	2	**Semester of Delivery**	1
Administering Department	Information Technology	**College**	College of Science
Module Leader	Dr. Ismail Mohamed El-Dessouki	**e-mail**	ismail.m@uowa.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Ayman Mohammed Gabr	**e-mail**	ayman.mo@uowa.edu.iq
Peer Reviewer Name	Asst. Prof. Dr. Shaima Hussein Noufal	**e-mail**	shaymaa@uowa.edu.iq
Scientific Committee Approval Date	2024-09-17	**Version Number**	V1.0

Relation with other Modules

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

Department Head Approval

Dean of the College Approval

Module Aims, Learning Outcomes and Indicative Contents	
1. Module Aims	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	Important: Write at least 6 Learning Outcomes, better to be equal to 10. 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	Learning concepts of each theoretical lecture or groups of lectures. [SSWL= 28hrs] Lab. Lectures Learning concepts of each laboratory lecture or groups of lectures. [SSWL=30 hrs] Mid Exam =1hrs Final Exam =3hrs Total hrs = 62

Learning and Teaching Strategies	
Strategies	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.

Student Workload (SWL)			
Structured SWL (h/sem)	60	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	87	**Unstructured SWL (h/w)**	5.8
Total SWL (h/sem)	147 + 3 final =150		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	5%(10)	4,8	2,4
	Home Work	2	5%(10)	6,10	1
	Onsite Assignments	2	5%(10)	3,4	5,13
	Report	1	10%(10)	5	3,5
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	
	Final Exam	3hr	50% (50)	16	
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	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)	
	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

	Text	Available in the Library?
Required Texts	Fundamentals of 1. Thermodynamics, by claus borgnakke Richard e. Sonntag	
Recommended Texts	Thermodynamics: Principles and Applications, by Frank C. AndrewsYear, Publisher.n,	
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

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