	Ministry of Higher Education and Scientific Research - Iraq Al-Mustaqbal University College for engineering and technology Department of Biomedical Engineering	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	THERMODYNAMICS IN BME	**Module Delivery**	
Module Type	SUPLEMENT	❖ **Theory Lecture** ✓ **Lab** ❖ **Tutorial** ✓ **Practical** ✓ **Seminar**	
Module Code	UOMU0101064		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	UGx11 UGI	**Semester of Delivery**	6
Administering Department	BME	**College**	ER
Module Leader		**e-mail**	
Module Leader's Acad. Title		**Module Leader's Qualification**	
Module Tutor	None	**e-mail**	None
Peer Reviewer Name		**e-mail**	
Review Committee Approval		**Version Number**	1.0

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

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

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	This course aims at providing the student with the necessary basic and advanced concepts for the followings: 1- To develop an understanding of the laws of thermodynamics and an appreciation of their consequences 2- To develop some elementary analysis skills using the first and second laws of thermodynamics 3- Identifying thermodynamic systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Define thermodynamic concept 2. Learn the 1st law of thermodynamics and other basic concepts. 3. Explains thermodynamics laws 4. Calculates heat, work and energy for a given process
Indicative Contents المحتويات الإرشادية	Introduction, Define thermodynamic concept First law of thermodynamics / Explains thermodynamics laws Adiabatic and polytrophic processes, Open system processes / steady flow energy equation , and its application.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
Summative assessment	**Midterm Exam**	2 hr	20% (20)	10	LO # 1-10
	Final Exam	2hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction**
Week 2	**Define thermodynamic concept**
Week 3	**First law of thermodynamics**
Week 4	**Phase-Change Processes of Pure Substances**
Week 5	**T-v, P-v & P-T Diagrams of Phase-Change Materials**
Week 6	**Property Tables of (Steam, Ammonia, R-12, R-22, R-134a & Nitrogen)**
Week 7	**Property Tables of (Steam, Ammonia, R-12, R-22, R-134a & Nitrogen)**
Week 8	**Second law of thermodynamics**
Week 9	**Forms of Work**
Week 10	**The First Law of Thermodynamics for Closed Systems**
Week 11	**The First Law of Thermodynamics for Control Volume (Open System)**
Week 12	**The First Law for Steady State-Steady Flow Process**
Week 13	**The First Law for Uniform State-Uniform Flow Process**
Week 14	**Applications of thermodynamics**
Week 15	**Preparatory Week**

Week 16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Fundamentals of Engineering Thermodynamics ,Borgnakke & Sonntag and Wiley	Yes
Recommended Texts	Thermodynamics: An Engineering Approach, 5/e, by Yunus A. Cengel and Michael A. Boles	No
Websites		

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.