

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Chemical Engineering Principles II		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	BCE127		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Prof Dr. Alaa Kareem Mohammed	e-mail	dr.alaa@kecbu.uobaghdad.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Israa M, Rashid	e-mail	israa_msc2018@kecbu.uobaghdad.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		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

<p>Module Objectives أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. To provide a clear understanding of energy balance principles and their importance in chemical engineering.2. To apply the first law of thermodynamics to chemical systems and understand that energy cannot be created or destroyed, only converted from one form to another.3. To calculate changes in enthalpy for chemical reactions and use these values in energy balance calculations.4. To perform energy balance calculations on closed systems, where no mass transfer occurs.5. To consider the energy associated with mass flow rates, such as enthalpy changes due to fluid mixing or phase changes.6. To work on case studies or projects to develop their problem-solving skills and apply energy balance principles to engineering design and process optimization.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Understand the concept of energy balance in chemical engineering2. Define energy balance and its significance in chemical processes.3. Identify the different forms of energy involved in chemical engineering systems.4. Apply energy balance equations to chemical engineering systems.5. Develop and manipulate material and energy balance equations.6. Develop and manipulate material and energy balance equations.7. Apply critical thinking skills to identify and resolve energy-related challenges in chemical engineering systems.8. Collaborate with multidisciplinary teams to address energy-related issues in chemical engineering projects.9. Skills in solving problems.
<p>Indicative Contents المحتويات الإرشادية</p>	<p><u>Part A - Energy Balance Equations</u></p> <ul style="list-style-type: none">- Types of Energy: Identifying and quantifying different forms of energy involved in a system, including heat, work, potential energy, kinetic energy, and internal energy. [20 hr]- Converting between different energy units, such as joules (J), kilojoules (kJ), calories (cal), kilocalories (kcal), British thermal units (BTU), and kilowatt-hours (kWh). [10 hr].- Developing and applying energy balance equations to determine the energy inputs, outputs, and transfers within a system. This involves accounting for heat transfer, work done, and changes in internal energy. [25 hr]- Revision problem classes [6 hrs].

	<p>Part B – Enthalpy and Heat Capacity</p> <ul style="list-style-type: none"> - Utilizing enthalpy values and heat capacities to quantify the energy changes associated with temperature variations in a system. [30 hr] - Incorporating the energy changes associated with chemical reactions, such as heat of reaction or heat of formation, into the energy balance calculations. [23 hr]. - Accounting for energy changes during phase transitions, such as vaporization or condensation, and incorporating latent heat values into the energy balance equations. [30 hr] - Revision problem classes [6 hrs].
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<p style="text-align: center;">Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
Strategies	<p>Chemical Engineering Principles is a field of engineering that applies principles of chemistry, physics, and mathematics to design, develop, and optimize processes that convert raw materials into useful products, while ensuring safety, cost-effectiveness, and sustainability. It involves the design and operation of chemical plants and equipment, as well as the development and improvement of processes for making chemicals, fuels, and materials. In summary, Chemical Engineering Principles is a multifaceted field that involves the application of engineering principles to the design and development of processes and products that have a wide range of applications in various industries like energy, pharmaceuticals, food processing, and many others.</p>

<p style="text-align: center;">Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا</p>			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2hr(total)/6	25% (25)	3,5,7,9,10and 12	LO #1, #2 and #5
	Assignments	8hr (total)/5	15% (15)	2,4,6,8 and 13	LO #3, #4 and #9
	Projects / Lab.	-	-	-	-
	Report	-	-	-	-
Summative assessment	Midterm Exam	2hr/2	10% (10)	7	LO #1 - #3
	Final Exam	3hr/1	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Concepts and units
Week 2	Heat capacity
Week 3	Calculation of enthalpy changes
Week 4	The General Energy Balance
Week 5	Reversible Processes and Mechanical Energy Balance
Week 6	Energy balances without chemical reaction
Week 7	Energy balances without chemical reaction
Week 8	Energy balances with chemical reaction
Week 9	Energy balances with chemical reaction
Week 10	Heat of solution and mixing
Week 11	Heat of solution and mixing
Week 12	Humidity charts and their uses
Week 13	Humidity charts and their uses

Week 14	Unsteady state material and energy balance
Week 15	Unsteady state material and energy balance
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	"Basic Principles and calculations Engineering".5 th edition By David M. Himmelblau	Yes
Recommended Texts	"Chemical Process Calculations" by D.C. Sikdar,2013	yes
Websites	https://visimix.com/what-is-chemical-process-calculation/	

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.