

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Principles of Chemical Engineering		Module Delivery
Module Type	C		<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	UOMU0206022		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1	Semester of Delivery	
Administering Department	Fuel and Energy Techniques Engineering	College	Technical Engineering College- Al Mustaqbal university
Module Leader	Ali yaseen kadhim	e-mail	<a href="mailto:ali.yaseen.kadhim@uomus.edu.iq">ali.yaseen.kadhim@uomus.edu.iq</a>
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	Msc. Drilling Techniques
Module Tutor		e-mail	
Peer Reviewer Name	No	e-mail	
Scientific Committee Approval Date		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mass Balance and Energy Balance	Semester	L2-S1

Co-requisites module	None	Semester	
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## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> <li>To know the fundamentals of fundamentals units and dimensions.</li> <li>To know the conversion of units and conversion factors.</li> <li>To know the chief variables of process, such as mass, volume, flow rate, chemical composition, pressure, and temperature.</li> <li>To know the analyses of multicomponent solutions and mixtures.</li> <li>To know the fundamentals for material balances on batch, semi-batch, and continuous processes.</li> <li>To the knowledge of the general strategy for solving material balance problems.</li> <li>To the knowledge of the material balances without/ with chemical reactions.</li> <li>To know the real, ideal gases and vapors by studying their properties.</li> </ol>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>The student able to:</p> <ol style="list-style-type: none"> <li>Understanding the fundamentals units, dimensions, conversion of units, dimensional homogeneity and knowledge of the conversion of units and conversion factors.</li> <li>To knowledge the chief of process variables, such as mass, volume, flow rate, chemical composition, pressure, temperature and analyses of multicomponent solutions and mixtures.</li> <li>To knowledge the terms closed system and open system.</li> <li>To the knowledge of the fundamentals for material balances on continuous, batch, and semi-batch processes.</li> <li>To knowledge the process data representation, analysis, and know the flow charts and flow charts scaling.</li> <li>Understanding the overall and component balances and knowledge of the general strategy for solving material balance problems.</li> <li>Understanding the material balances without chemical reactions by choice of basis</li> <li>Understanding the material balances with chemical reactions by studying the limiting and excess reactants, conversion, yield, selectivity, and purging.</li> <li>Understanding of the gases and vapors by studying the properties of Ideal gases</li> <li>Understanding the material balances for ideal gas mixtures.</li> <li>Knowledge of real gases and real gas mixtures by studying equations of state, and compressibility charts.</li> </ol>
<p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following:</p> <ul style="list-style-type: none"> <li>● Introduction to Principles of Chemical Engineering, Fundamentals units, and dimensions, process data representation and analysis. (8 hr)</li> <li>● Process variables, such as mass, volume, flow rate, chemical composition, pressure, and temperature. (8 hr)</li> <li>● Fundamentals for material balances on continuous, batch, and semi-batch processes, Flow charts and flow charts scaling. (8 hr)</li> <li>● Define the terms closed and open systems. (4 hr).</li> <li>● material balances without chemical reactions by choice of basis, the overall and component balances. (8 hr)</li> <li>● Understanding the balances for systems with recycle and bypass streams, material balances with chemical reactions. (8 hr).</li> <li>● Studying the limiting and excess reactants, conversion, yield, selectivity, and purging. (8 hr)</li> <li>● Gases and vapors by studying the properties of Ideal gases, Understanding the material balances for ideal gas mixtures. (8 hr)</li> </ul>

- Real gases and real gas mixtures by studying equations of state, and compressibility charts. (8 hr)

## Learning and Teaching Strategies

### استراتيجيات التعلم والتعليم

#### Strategies

Assessment is based on hand-in assignments, written exam, quizzes, seminars, and Online testing.

## Student Workload (SWL)

### الحمل الدراسي للطالب

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	73	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	5
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	137	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	210		

## Module Evaluation

### تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	5% (5)	3,6, 9,12	
	Assignments	2	5% (5)	6, 12	

	<b>Projects / Lab.</b>	0	0% (0)	-	
	<b>Report</b>	0	0% (0)	-	
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hr	40% (40)	7	
	<b>Final Exam</b>	2hr	50% (50)	15	
<b>Total assessment</b>			100% (100 Marks)		

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

	<b>Material Covered</b>
<b>Week 1-3</b>	<b>Introduction to Engineering Calculations:</b> Unit, dimensions, conversion of units and dimensional homogeneity, process data representation and analysis.
<b>Week 4-6</b>	<b>Process Variables:</b> Mass, volume, flow rate, chemical composition, pressure, and temperature.
<b>Week 7-8</b>	<b>Fundamentals of Material Balances:</b> <ul style="list-style-type: none"> <li>- Introduction to Material Balances and Choose of basis,</li> <li>- Overall and component balances for systems,</li> <li>- A General Strategy for Solving Material Balance Problems</li> </ul>
<b>Week 9-11</b>	<b>Material Balances without Chemical Reactions:</b> Balances on continues, batch and semi-batch processes, flow charts, flow charts scaling.
<b>Week 12</b>	<b>Material Balances with Chemical Reactions</b> Limiting and excess reactants, conversion, yield, selectivity, purging.
<b>Week 13</b>	<b>Gases and Vapors:</b> Ideal gases, material balances for ideal gas mixtures
<b>Week 14</b>	<b>Real gases:</b> Equations of state, compressibility charts, real gas mixtures.
<b>Week 15</b>	<b>Final Exam</b>

## Learning and Teaching Resources

### مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	<ul style="list-style-type: none"> <li>- Richard M. Felder and Ronald W. Rousseau, "ELEMENTARY PRINCIPLES OF CHEMICAL PROCESSES", Third Edition, John Wiley &amp; Sons, Inc., 2005, Edition, with Integrated Media and Study Tools.</li> <li>- David M. Himmelblau, James B. Riggs, 2012, "Basic principles and calculations in chemical engineering", 8th edition.</li> </ul>	No
<b>Recommended Texts</b>	<ul style="list-style-type: none"> <li>- Richard M. Felder, 2019, "Elementary principle of chemical Processes" 4th edition.</li> <li>- Mass and Energy Balancing Calculations for Plant Design, David Pritchard and Shaik Feroz, © 2021 Taylor &amp; Francis Group, LLC</li> </ul>	No
<b>Websites</b>		

## Grading Scheme

### مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
<b>Success Group (50 - 100)</b>	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
<b>Fail Group (0 - 49)</b>	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.