MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Reactor Design 1**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☒ **Practical** ☒ **Seminar**	
Module Code	**UOMU0206063**				
ECTS Credits	**5**				
SWL (hr/sem)	**150**				
Module Level	UGIII		**Semester of Delivery**	6	
Administering Department	**Fuel and Energy Techniques Engineering Department**		**College**	**Engineering Technical college**	
Module Leader	**Mahdi Shanshal Jafar**		**e-mail**	mahdi.Jaafar@uomus.edu.iq	
Module Leader's Acad. Title	**Lecturer**		**Module Leader's Qualification**	**PhD in Chemical Engineering**	
Module Tutor	**Shahad mahmood mohammed**		**e-mail**	shahad.mahmood.mohammed@uomus.edu.iq	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى

Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	▪ Allow students to develop knowledge, skills, and capabilities in diverse areas focusing on Chemical Engineering ▪ Enable students to develop a comprehensive understanding of the methodology of linking chemical kinetics with material and energy conservation in the design of idealized homogeneous chemical reactors and bio-reactors, operating either in batch or continuous mode, and under either isothermal or non-isothermal conditions
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The students who succeeded in this course; 1. Analyze reaction systems and reactors 2. Develop creative and critical thinking skills 3. Solve open ended problems
Indicative Contents المحتويات الإرشادية	Introduction to reactor design (Definition of the Rate of Reaction, Classification of reactors). Conversion and Reactor Sizing Conservation of mass in reactors. The ideal stirred-tank reactor (Batch and steady-state flow) The ideal tubular flow reactor (PFR) Space-time and space velocity Design procedure: Batch reactor (constant volume and constant pressure) Design procedure: Continuous stirred-tank reactors (Single and multiple reactions) Design procedure: Tubular-flow reactors Comparison of stirred-tank and tubular-flow reactors. Flow recycles reactors Non-steady flow (semi-batch) reactors Energy conservation equations Batch stirred-tank reactors Continuous stirred-tank reactors Plug flow reactors in series and/or parallel

	Equal- size mixed flow reactors in series (first order and second order reactions) Mixed Flow Reactors of different sizes in series. Best arrangement of a set of ideal reactors

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lecture, Demonstration, Discussion, Question and Answer, Drill and Practice, Problem Solving.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	60	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	90	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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**
Formative assessment	**Quizzes**	2	10%	5,10	
	Assignments	5	10%	3,57,10,12	
	Projects / Lab.				
	Report	1	10%	1-14	
	Midterm Exam	2 hours	20%		

Summative assessment	**Final Exam**	2 house	50%		
Total assessment			100%		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Thermodynamics of Chemical Reaction
Week 2	Thermodynamics of Chemical Reaction
Week 3	**Kinetics of Chemical Reaction:**
Week 4	**Kinetics of Chemical Reaction:**
Week 5	**Kinetics of Chemical Reaction:**
Week 6	**Design of Isothermal–Ideal Reactor**
Week 7	**Design of Isothermal–Ideal Reactor**
Week 8	**Design of Isothermal–Ideal Reactor**
Week 9	**Midterm**
Week 10	**Recycle reactor and Self-catalytic reactor**
Week 11	**Recycle reactor and Self-catalytic reactor**
Week 12	**Recycle reactor and Self-catalytic reactor**
Week 13	**Multiple Reactions**
Week 14	**Multiple Reactions**
Week 15	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	

Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	1. Elements of Chemical Reaction Engineering, H. Scott Fogler, Prentice Hall, 2001	No
Recommended Texts	1. Chemical Reactor Analysis and Design, Gilbert F. Froment, Kenneth B. Bischoff, John Wiley & Sons, 1990 2. Octave Levenspiel (1999),CHEMICAL REACTOR ENGINEERING, 3rd edition, John Wiley & Sons Inc., USA ISBN: 9780471254249 3. J.M. Smith (1987), CHEMICAL ENGINEERING KINETICS, 3rd edition, McGraw-Hill International Editions, Singapore. ISBN: 9780070587106	No
Websites	http://websites.umich.edu/~elements/5e/	

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.