MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Technology of Petroleum Refinery			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	PER406				
ECTS Credits	4				
SWL (hr/sem)	45				
Module Level		1	**Semester of Delivery**		1
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Maher Obaid Ahmed		**e-mail**	maher.obeed@uomosul.edu.iq	
Module Leader's Acad. Title		Senior lecturer	**Module Leader's Qualification**		Master
Module Tutor	----------		**e-mail**	E-mail-------	
Peer Reviewer Name		----------	**e-mail**	E-mail-------	
Scientific Committee Approval Date		01/06/2023	**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 Objectives أهداف المادة الدراسية	1. To understand Definition of petrochemicals, Source of Petrochemicals, Classification of Petrochemicals to understand Composition and properties of crude oil. 2. This course deals with Crude oil evaluation, Crude oil distillation, Catalytic processes in petroleum refinery, Catalytic Hydrodesulphurization process, Steam cracking of hydrocarbons, Catalytic Reforming process, Steam reforming of hydrocarbons (Synthesis gas, H_2, & Carbon oxides).
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The detailed of a petroleum refinery such as Composition and properties of crude oil: Definition of crude oil, Elemental analysis of crude oil, Composition of crude oil, crude oil properties, classification of crude oil, characterization factor and API gravity, Sulfur content, Cloud and Pour Points, Carbon Residue, Salt Content, Flash point, Aniline point, Refinery flow and major refinery products. Introduction, Atmospheric distillation, Vacuum distillation, Material & heat balance, Types of reflux, column temperatures, Column diameter, The main equipments in topping units (Heat exchanger, Furnace). Definition, Flow diagram and process description, Cracking reactions, FCC catalyst, Equipment. Definition and purpose, Feed stocks, Reactions, Catalyst system, Process flow diagram (Fixed bed semiregenerative reforming), Reactor performance and operating conditions.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module; Encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, The practical application, interactive tutorials, the displaying of industrial reportages, and alternative quizzes.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	45	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem)	15	**Unstructured SWL (h/w)**	1

الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**60**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	10% (10)		
	Assignments	4	10% (10)		
	Projects / Lab.	7	10% (10)		
	Report	1	10% (10)		
Summative assessment	**Midterm Exam**	2hr	10% (10)		
	Final Exam	3hr	50% (50)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1-2	**Composition and properties of crude oil**: Definition of crude oil, Elemental analysis of crude oil, Composition of crude oil, crude oil properties, classification of crude oil, characterization factor and API gravity, Sulfur content, Cloud and Pour Points, Carbon Residue, Salt Content, Flash point, Aniline point, Refinery flow and major refinery products.
Week 3	**Crude oil evaluation:** Distillation curves, ASTM distillation, True boiling point, Equilibrium or flash vaporization curve, Property curves, cut point, Typical finished products
Week 4-5	**Crude oil Preparation for refining:** Degassing of crude oil, Stabilization of crude oil, Desalting of crude oil, Continuous Settler design.
Week 6-7-8	**Crude oil distillation:** Introduction, Atmospheric distillation, Vacuum distillation, Material & heat balance, Types of reflux, column temperatures, Column diameter, The main equipments in topping units (Heat exchanger, Furnace).
Week 9-10	**Catalytic processes in petroleum refinery**: **Fluidized bed Catalytic cracking (FCC):** Definition, Flow diagram and process description, Cracking reactions, FCC catalyst, Equipment.
Week 11-12	**Catalytic Hydrodesulphurization process:** Introduction, Reactions, Catalyst, process flow diagram, Operating conditions.
Week 13-14	**Catalytic Reforming process:** Definition and purpose, Feed stocks, Reactions, Catalyst system, Process flow diagram (Fixed bed semiregenerative reforming), Reactor performance and operating conditions.
Week 15	Exam.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Fundamentals of Petroleum Refining** 1st Edition - November 19, 2009 **Authors:** Mohamed A. Fahim, Taher A. Al-Sahhaf, Amal Elkilani Hardback ISBN: 9780444527851 9 7 8 - 0 - 4 4 4 - 5 2 7 8 5 - 1 eBook ISBN: 9780080931562.	NO
Recommended Texts	Nelson, W.L., ***Petroleum Refinery Engineering***, McGraw-Hill**.**	No
Websites	Fahim, M.A.; Al-Shahhaf, T.A. and Elkilani, A.S., ***Fundamentals of Petroleum Refining***, Elsevier.	

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 is required but credit awarded
	F – Fail	راسب	(00-44)	A 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.