

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Physical chemistry		Module Delivery	
Module Type	C		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code				
ECTS Credits	6			
SWL (hr/sem)	102			
Module Level	UGII	Semester of Delivery		
Administering Department	Fuel and Energy Technologies Engineering	College	Shatt Al-Arab University College	
Module Leader	Murtada Firas Hassa	e-mail	Murtada.Firass@sa-uc.edu.iq	
Module Leader's Acad. Title	Assistance Lecturer	Module Leader's Qualification	MSc. Chemistry	
Module Tutor		e-mail		
Peer Reviewer Name		e-mail		
Scientific Committee Approval Date		Version Number		
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	1. Develops understanding of mass, energy, heat, work, efficiency, ideal and real 2. Understanding the thermodynamic cycles and processes. 3. To know the Covers first and second laws of thermodynamics 4. To know the perfect gas law, properties of real gases, 5. Understanding the general energy equation for closed and open systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The student able to: 1. Understand the thermodynamic cycles and processes. 2. To know the main equation for closed and open systems. 3. Understand the meaning thermodynamics, perfect gas law. 4. Understand the properties of real gases, and the general energy. 5. Enable students to obtain knowledge and understanding of the principles of gas laws 6. Enabling students to obtain knowledge and understanding of the laws of thermodynamics 7. Enabling students to obtain knowledge and understanding of the 8. relationship between laws 9. Enabling students to acquire knowledge of the methods of deriving the basic 10- Enable students to identify the most important applications of Thermodynamics
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to thermodynamic. 2. Main equation for closed and open systems. 3. identify the most important applications of 4. acquire knowledge of the methods of deriving the basic equations of thermodynamics, Ideal and real gases 5. Introduction to gas law.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Assessment is based on hand-in assignments, written exam, Quizzes, reports, seminars, Practical testing and Online testing.
-------------------	---

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	78	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	180		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	10% (10)		
	Assignments	2	10% (10)		
	Projects	1	10% (10)		
	Report/ Lab.	10	10% (10)		
Summative assessment	Midterm Exam		10% (10)		
	Final Exam	4 hr	50% (50)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	History and Development of Refining Processes, Kinds of Refineries, Refinery feed stocks and products
Week 2	Classification and Evaluation of crude petroleum and its derivatives
Week 3	Processing of Petroleum Liquids: Stabilization dehydration, tube still heaters , Atmospheric and Vacuum Fractionation towers.
Week 4	Material and Energy Balances, Refluxes, Temperature Distribution in Fractionation Tower.
Week 5	Upgrading the Distillates: Alkylation and Isomeric transformation, Catalytic polymerization, Thermal cracking processes, Catalytic polymerization
Week 6	Processing of Petroleum, Processing of Petroleum Liquids: Stabilization dehydration, tube still heaters. Atmospheric and Vacuum Fractionation towers. Material and Energy Balances, Refluxes, Temperature Distribution in Fractionation Tower.
Week 7	Treating Process
Week 8	Vapor Pressure, Octane Number, Viscosity, Flash Point, Aniline Point and Pour Point.
Week 9	Petroleum distillates additives: Anti knocking, Anti-oxidant, Anti-corrosion, Anti-vaporization, Combustion inhibitors, Anti foaming
Week 10	Dewaxing. Coking and treatment of bottom of the barrel, Residue upgrading
Week 11	Vapor Pressure, Octane Number, Viscosity, Flash Point, Aniline Point and Pour Point.
Week 12	
Week 13	Distillation Curves ,Mid present, flash-vaporization, and yield curves
Week 14	Lubricants oil processing: propane deasphalting ,Solvent extraction
Week 15	Refinery economics
Week 16	Final exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Safety in laboratory, laboratory tool , How to write a scientific report
Week 2,3	Measurement of the density by pycnometer and hydrometer
Week 4,5	Extraction of heavy oils from water
Week 6,7	measurement Surface tension
Week 8.	measurement refractive index
Week 9	Viscosity measurement
Week 10,11	Find the calorimeter constant
Week 11,12	the molecular weight of a volatile liquid using the Dumas method
Week 13	solubility
Week14	Preparatory week before the final Exam
Week15	final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Physical chemistry/ 4th edition/ Houghton Mifflin Co. / N.Y. / 2003	yes
Recommended Texts	Physical Chemistry/ P.W.Atkins/ 9th edition / Oxford university press/ 2009	no
Websites	https://chem.libretexts.org/Special:FirstLoginWelcome?return=	

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.