MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Thermodynamic Chemistry II**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**Che-24121**			☒ **Lecture**	
ECTS Credits	**6**			☒ **Lab**	
SWL (hr/sem)	**150**			☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	2		**Semester of Delivery**		4
Administering Department	Chem		**College**	CoS	
Module Leader	Ahmed Najem Abd		**e-mail**	dr.ahmednajemabd@uodiyala.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**	E-mail	
Peer Reviewer Name	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	Teach students the chemical reactions of gases and thermochemistry, and know how to solve problems related to them. Clarification of the energies of the bonds of organic interactions and knowledge of the first, second and third laws in thermodynamics And its practical applications aimed at developing and keeping pace with the scientific development of physical chemistry. Teaching and educating students on all the necessary and necessary information related to physical chemistry, which It qualifies them to work and research in all areas of physical chemistry
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Enable students to obtain knowledge and understanding of physical chemistry Enable students to obtain knowledge and understanding of gas reactions Enable students to obtain knowledge and understanding of the first, second and third laws of thermodynamics Enable students to obtain knowledge and understanding of examples and problems of physical chemistry. knowledge skills – remembering , the skills of recall and analysis Use and development skills
Indicative Contents المحتويات الإرشادية	physical chemistry, gas reactions , Entropy, Entropy of mixing ideal gases , Maxwell reaction , Gibbs-Helmholtz equation , Statistical thermodynamics , The Boltzmann law

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	

	Method of lectures (clarification and explanation of the study materials) through the blackboard, smart board, and computer. -Providing students with the basics and additional topics related to previous education outcomes for skills to solve scientific problems. -Providing students with knowledge through homework and assignments for physical chemistry. -Asking students to visit the library to obtain additional knowledge of the study materials. -Improving students' skills by visiting websites to obtain additional knowledge of the study subjects. -Asking students during the lecture to solve some practical problems..

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7

	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Entropy
Week 2	Spontaneous processes and entropy
Week 3	Entropy changes for typical processes
Week 4	Entropy of mixing ideal gases
Week 5	Free energy functions
Week 6	Maxwell reaction
Week 7	Gibbs-Helmholtz equation
Week 8	**Midterm Exam**
Week 9	Phase equilibrium
Week 10	Phase diagrams of Mixtures
Week 11	Liquid –Liquid phase diagrams
Week 12	Statistical thermodynamics
Week 13	The Boltzmann law
Week 14	The partition function, Thermodynamics functions for rotation, vibration, and electronic excitation
Week 15	**Midterm Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Phase diagram of a binary group consisting of (solid - solid)
Week 2	Phase diagram of a binary group consisting of (solid - solid)
Week 3	Determine the relative and absolute densities of an unknown liquid
Week 4	Determine the relative and absolute densities of an unknown liquid
Week 5	Find the density of water at different temperatures
Week 6	Find the density of water at different temperatures
Week 7	Adsorption in solutions
Week 8	Adsorption in solutions
Week 9	Adsorption in solutions
Week 10	Adsorption in solutions
Week 11	Distribution of acetic acid between benzene and water
Week 12	Distribution of acetic acid between benzene and water
Week 13	Distribution of acetic acid between benzene and water
Week 14	Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Phy.chem.gases and thermodynamics ,A.F.Dawood Al-Niaimi	Yes
Recommended Texts	1-PHy.chem. water J.Moor 2--Phy.chem. Danials 3-Atkins 4-Phy.chem. J.Barroue 4-Element of chemical thermodynamic L.K.Nash	No

	5-Thermodynamics for chemistry	
Websites	www.byPhysical Chemistry Books Adwww.scienceforums.com/forum/chemistr toco.com	

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.