جامعة : المنصورة

كـــلية : العلوم

قسم / الكيمياء

توصيف مقرر دراسى

١- بيانات المقرر		
الرمز الكود :ك ٣٤٤	**أسم المقرر :**Statistical Mechanics	**المستوى : الثالث**
البرنامج : الكيمياء	**عدد الوحدات الدراسية: ٢ نظرى : ٢ تمارين: ١ عملى:-**	

٢- هدف المقرر :	**For students undertaking this course, the aims are to:** 1 - clarify the relation between thermodynamics, quantum mechanics and statistical mechanics 2 - investigate the concepts of canonical ensemble and canonical partition function 3 - investigate the canonical partition function for a system of noninteracting particles including Boltzmann distribution law 4 - train students to apply statistical mechanics for systems such as ideal diatomic and polyatomic gases
٣- المستهدف من التدريس المقرر:	
أ-المعلومات والمفاهيم:	**a- Knowledge and Understanding :** a - 1 - understand the basic concepts and the aim of statistical mechanics a - 2 - recognize the basic postulates of statistical mechanics a - 3 - correlate the thermodynamic parameters of a system to its canonical partition function a - 4 - apply statistical mechanics to systems of noninteracting particles such as ideal monoatomic and diatomic gases a - 5 - apply statistical mechanics to systems with intermolecular forces **On completing this course, students will be able to:**
ب-المهارات الذهنية:	**b- Intellectual Skills: On completing this course, students will be able to:**

b - 1 - differentiate between concepts such as macro- and micro- quantum states of the system b - 2 - imagine hypothetical considerations such as canonical ensemble and partition functions b - 3 - determine the suitable approximations which simplify the application of statistical mechanics to different systems	
c-Professional and Practical Skills: On completing this course, students will be able to: c - No practical hours	**ج- المهارات المهنية الخاصة بالمقرر:**
d-General and Transferable Skills: On completing this course, students d - 1 - work effectively both in a team and independently to solve problems. d - 2 - use IT and search for information d - 3 - communicate effectively with his teacher and colleagues **will be able to:**	**د- المهارات العامة :**
1- Aims, terms and postulates of statistical mechanics. This involves: The canonical ensemble - Postulates of statistical mechanics - Canonical partition function - Calculation of thermodynamic parameters in terms of canonical partition function 2- Derivation of canonical partition function for a system of noninteracting particles and Boltzmann distribution law 3- statistical thermodynamics of ideal diatomic and monoatomic gases 4- statistical thermodynamics of ideal polyatomic gases 5- statistical mechanical treatment of entropy and the third law of thermodynamics 6- statistical mechanics for systems with intermolecular forces	**٤- محتوى المقرر:**
1 - class lectures using board 2 - electronic learning using computer, data-show system and the internet 3 - training on solving problems	**٥- اساليب التعليم والتعلم:**
The same as normal students, only skeletal disabilities are allowed in	**٦- أساليب**

the Faculty of Science.	**التعليم والتعلم للطلاب ذوى القدرات المحدودة:**

٧- تقويم الطلاب :

أ- الأساليب المستخدمة :

7- Student Assessment Methods

Final exam	**to assess**	a1-a5, b1-b3
Oral exam	**to assess**	d1,d3
Mid-term exam	**To assess**	a1-a5, b1-b3
Report	**to assess**	d1-d3

ب- التوقيت :

Assessment Schedule

Assessment 1	**Week #final exam**	**Week 14**
Assessment 2	**Week #oral exam**	**Week 14**
Assessment 3	**Week #mid-term exam**	**Week 8**
Assessment 4	**Week #report**	Week 10

ج- توزيع الدرجات :

Weighting of Assessments

Final-Term Examination	**80%**
Oral Examination	**10%**
Practical Examination	**0%**
Semester work	**0%**
Mid-term examination	**10%**
Other types of assessment	**0%**

	Total	**100%**		
٨- قائمة الكتب الدراسية والمراجع :				
				أ- مذكرات:
1 - Physical chemistry, I. N. Levine, 4th ed., McGRAW-Hill, 1995. 2 - Equilibrium statistical mechanics, F. C. Andrews, 2nd ed., Wiley, 1975.				**ب- كتب ملزمة**
				ج- كتب مقترحة :
				د- دوريات علمية أو نشرات..

مصفوفة المعارف والمهارات المستهدفة من المقرر الدراسى

المحتويات للمقرر	أسبوع الدراسة	المعارف الرئيسية	مهارات ذهنية	مهارات مهنية	مهارات عامة
1- Aims, terms and postulates of statistical mechanics. involving: The canonical ensemble -Postulates of statistical mechanics - Canonical partition function - Calculation of thermodynamic parameters in terms of canonical partition function	1,2	a1-a3	b1,b2		d1
2- Derivation of canonical partition function for a system of noninteracting particles and Boltzmann distribution law	3,4	a3,a4	b2		d1
3- statistical thermodynamics of ideal diatomic and monoatomic gases	5,6	a3,a4	b2,b3		d1,d2
4- statistical thermodynamics of ideal polyatomic gases	7,8	a3,a4	b3		d1-d3

5- statistical mechanical treatment of entropy and the third law of thermodynamics	9,10	a3	b3		d1-d3
statistical mechanics for systems with intermolecular forces	11,12	a5	b3		d1-d3

أستاذ المادة : ا.د/ عصام عرفه حسن جمعه

رئيس مجلس القسم العلمي : أ.د /سالم السيد سمرة