معلومات المقرر * (Course Information):

اسم المقرر:	كيمياء الديناميكا الحرارية	
رقم المقرر:	232	
اسم ورقم المتطلب السابق:	حساب تفاضل وتكامل -1	
اسم ورقم المتطلب المرافق:	-	
مستوى المقرر:	الرابع	
الساعات المعتمدة:	(2+2)3	

Module Title:	**Thermodynamic Chemistry**
Module ID:	**Chm232**
Prerequisite (Co-requisite):	**Math101**
Co-requisite:	-
Course Level:	4 th level
Credit Hours:	(2+2)3 hrs.

Module Description

وصف المقرر:

The course covered the following topics: Introduction to thermodynamics, Basic concepts, The first law in thermodynamics, Application of first law in thermodynamics. The Second Law of Thermodynamics, Carnot cycle and entropy. Third law of Thermodynamics, Gibbs Free Energy, standard molar Gibbs energy, Thermodynamic and Chemical equilibrium.

Experimental part is designed to complement the lecture material. Emphasis is placed on experimental methodology and data acquisition by assisting computer.

Module Aims

أهداف المقرر:

1	**For students undertaking this course, the aims are to:** - Introduce the basic concepts of thermodynamics.
2	- Introduce an idea about the maximum work and the chemical affinity.

3	-Describe the first law in thermodynamics and relationship between work and internal energy	
4	-Study the second law of thermodynamics and its applications	
5	Study the chemical equilibrium and the factors that affect on it.	
6	Study the thermochemistry and the principles of thermodynamics and solving some problems.	

Learning Outcomes: مخرجات التعليم:

1	Recognize the basics of thermodynamics (such as System- types…etc),	
2	Explain the laws of thermodynamics,	
3	Apply of the concept of free energies and their relation to the interpretation of automatic chemical reactions to Solve the unexpected problems by creative ways	
4	Participate Effective in the activities of the methodology , Learn how to search for information through library and internet.	
5	Use information technology , modern computer tools to locate and retrieve scientific information relevant to themrodynamic chemistry and communicate with teacher through solve problems and work in groups	
6	Use laboratory tools and security and safety tools properly	

Course Contents: محتوى المقرر:

ساعات التدريس (Hours)	عدد الأسابيع (Weeks)	قائمة الموضوعات (Subjects)	
2	1	Introduction to thermodynamics , Basic concepts	
4	2	Expansion work, Types of systems & surroundings , Heat capacity ,Enthalpy, Relationship between C_v & C_p	
2	1	The first law in thermodynamics	
2	1	Standard Enthalpy changes , Enthalpies of physical change , , Enthalpies of chemical change	
4	2	Applications of first law in thermodynamics, Temperature dependence of reaction enthalpies…etc.	
4	2	The Joule-Thomson Experiment , And problems.	
4	2	The Second Law of Thermodynamics, Carnot cycle ,and entropy	

2	1	First and Second laws combined- Entropy changes in different systems, Gibbs-Helmholtz equation- Free energy of ideal gases.
4	2	The third law of thermodynamics, Approach to absolute zero- Free energies of gaseous reactions from the third law -Entropy of gases.
2	1	Revision
(Practical) 26	13	Practical experiments for theoretical lectures.

Note: وcontact hour = 50 min

Textbook and References:

الكتاب المقرر والمراجع المساندة:

ISBN	سنة النشر **Publishing Year**	اسم الناشر **Publisher**	اسم المؤلف (رئيسي) **Author's Name**	اسم الكتاب المقرر **Textbook title**
http://www.chem.umd.edu/thermobook	Second Edition Version 7a, December 2015	University of Maryland, College Park, Maryland	HOWARD DEVOE	THERMODYNAMICS AND CHEMISTRY

ISBN	سنة النشر **Publishing Year**	اسم الناشر **Publisher**	اسم المؤلف (رئيسي) **Author's Name**	اسم المرجع **Reference**
http://www2.chem.umd.edu/thermobook/v8-print.pdf	Second Edition Version 8, October 2016	e-book by Howard De Voe	Howard De Voe	**Thermodynamics and Chemistry**
978-007-127220-9	2010	Mc Graw Hil	Raymond Chang	Chemistry (10th edition)
	11th ed. 2018	Oxford University Press	Peter Atkins, and etc.,	Physical Chemistry
ISBN-13: 978-1429287326 ISBN-10: 1429287322	2005	W.H.Freeman, Oxford University Press, New York,.	Atkins, P.W.	**Elements of physical chemistry**
ISBN-13: 978-0805338423 ISBN-10: 080533842X	2006	Pearson Benjamin Cummings, San Francisco,	Thomas Engel , Philip Reid	**Physical chemistry**

0-07-351109-9	2010	4th ed هر McGraw-Hill Companies	Raymond Chang	Chemistry

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مواقع الكترونية هامة :

http://eppe.tripod.com/index.htm

http://soo.gd/VfJx

* يتم تعبئة معلومات المقرر فقط باللغتين العربية والانجليزية وباقي المعلومات بلغة التدريس المعتمدة ويكرر لكل مقرر في الخطة الدراسية

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* Course Information should be filled in Arabic and English. Other information should be filled using the approved teaching language at the college.