



توصيف مساق.....Chem 403341.....

1. معلومات مدرس المساق (Instructor)

Raid Banat	اسم (مدرس / منسق) المساق :
12.00-13.00 Sun-Wed	الساعات المكتتبة :
2132	رقم المكتب والرقم الفرعي :
raidbanat@aabu.edu.jo	البريد الالكتروني :
NA	مساعد البحث والتدريس/المشرف/الفني (إن وجد):

2. وصف المساق (Course Description)

This course addresses chemical kinetics processes on a molecular level, and cover the main and detailed principles of Electrochemistry. It addresses the collision theory, transition state theory and looks at rates and mechanisms of chemical reactions. It also looks at complex reactions. From the electrochemical viewpoint, it looks at various electrochemical laws, the Debye Huckel theory and the chemistry of ions mobility and transport number in solution. With the prerequisite 403241, the course helps to give a complete picture of kinetics and electrochemistry.

3. بيانات المساق (Course Title)

المستوى: Level 3	اسم المساق: Physical Chemistry II	رقم المساق: 403341
وقت المحاضرة: 9.15-10.30	المتطلب السابق / المتزامن: Physical Chem. I	طبيعة المساق: نظري/عملي
عدد الساعات الدراسية: 3	الفصل الدراسي: Summer	العام الجامعي: 2018 / 2019

4. أهداف المساق (Course Objectives)

To study the kinetic collision theory and transition state theory and complex formation of a chemical processes to serve pre-exponential factor evaluation and rate constant	أ-
To study kinetic rate of chemical reaction and factors affecting the rate of a chemical reaction	ب-
To study reaction mechanisms of simple and complex reactions	ج-
To study electrochemical reactions from the molecular point of view and cover conductance, molar conductivity, electrolytic conductivity concepts	د-

To study various laws of electrochemistry and various batteries as an application in electrochemistry

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5. مخرجات التعلم (Intended Student Learning Outcomes)
(المعرفة والمهارات والكفايات)

يفترض بالطالب بعد دراسته لهذا المساق أن يكون قادرا على:

After completing the course, the student will be able to:

1. Master basic principles in chemical kinetics for simple reactions.
2. Recognize Arrhenius law, kinetic collision theory and transition state theory in understanding pre-exponential factor and rate constant in rate law
3. Identify the difference between simple and complex reaction mechanisms
4. Command the main principles leading to the electrolytic solution properties
5. Utilize theories leading to clarify the way of conduction in weak and strong
6. Understand the concept of relaxation effect and electrophoretic effect in strong electrolyte
7. Recognize electrochemistry applications in batteries

8. محتوى المساق (Course Content)

الموضوع	الأسبوع
Chapter 9 Chemical Kinetics I Rates of Consumption and Formation, Rate of Reaction,	الأول
Analysis of Kinetic Results , Relaxation Methods, Influence of Temperature on Reaction Rates, The Arrhenius Equation,	الثاني
Potential-Energy Surfaces , The Pre-exponential Factor, Reactions in Solution. Empirical Rate Equations	الثالث
Pre-exponential factor Arrhenius and transition state theories, factors affecting the rate of chemical reactions	الرابع
First Exam (End of week 4; Chapter 9)	
Chapter 10 Chemical Kinetics II Evidence for a Composite Mechanism, Types of Composite Reactions,	الخامس
Rate Equations for Composite Mechanisms, Rate Constants, Rate Coefficients, and Equilibrium Constants,	السادس

Chapter 7 Solution of Electrolytes Faraday ' s Law of Electrolysis, Molar Conductivity, Weak Electrolytes, Strong Electrolytes,	السادس
Independent Migration of Ions, Transport Numbers, Ion Conductivities, Thermodynamics of Ions, Activity Coefficients, Ionic Equilibria, The Donnan Equilibrium.	السابع
Second Exam (End of week 7; Chapters 4-6)	
Chapter 8 Electrochemical Cells The Daniell Cell, Standard Electrode Potentials, Thermodynamics of Electrochemical Cells,	الثامن
Types of Electrochemical Cells, Application of EMF Measurements, Fuel Cells. Eid Al-adha vacation (not covered, self-reading)	التاسع
Final Exam (week 10; All material covered)	
	العاشر

9. استراتيجيات التعليم والتعلم وطرق التقويم
(Teaching and learning Strategies and Evaluation Methods)

ت	مخرجات التعلم	استراتيجيات التدريس	أنشطة التعلم	نوع التقويم/القياس (امتحان/عروض صفية/مناقشة/واجبات)
1	Master basic principles in chemical kinetics for simple reactions.	- Home works - Problem solving - Oral discussions - Class room participation	- Class notes - Continuous discussion of the material - Problem sets and solutions.	- Examination
2	Recognize Arrhenius law, kinetic collision theory and transition state theory in understanding pre-exponential factor and rate constant in rate law	Lectures - home works - Problem solving - Oral discussions - Class room participation	- Class notes - Continuous discussion of the material - Problem sets and solutions.	- Examination

- Examination	- Class notes - Continuous discussion of the material - Problem sets and solutions.	- home works - Problem solving - Oral discussions - Class room participation	Identify the difference between simple and complex reaction mechanisms	3
- Examination	- Class notes - Continuous discussion of the material - Problem sets and solutions.	- home works - Problem solving - Oral discussions - Class room participation	Command the main principles leading to the electrolytic solution properties	4
- Examination	- Class notes - Continuous discussion of the material - Problem sets and solutions.	Lectures - home works - Problem solving - Oral discussions- Class room participation	Utilize theories leading to clarify the way of conduction in weak and strong	5
- Examination	- Class notes - Continuous discussion of the material - Problem sets and solutions.	- home works - Problem solving - Oral discussions- Class room participation a	Understand the concept of relaxation effect and electrophoretic effect in strong electrolyte	6
- Examination	- Class notes - Continuous discussion of the material - Problem sets and solutions.	- home works - Problem solving - Oral discussions - Class room participation	Recognize electrochemistry applications in batteries	7

1. تقييم الطلبة (Assessment)

توزيع الدرجات لكل أسلوب	توقيت التقييم	الأساليب المستخدمة
0	خلال الفصل	1-أعمال الفصل: (تقرير، وظائف، حضور)
25%	الأسبوع الرابع	2-امتحان تحريري أول
25%	الأسبوع السابع	2-امتحان تحريري ثاني
50%	أسبوع الامتحانات النهائية	3-امتحان تحريري نهائي

2. الكتاب المقرر (Text Book)

Physical Chemistry	المرجع الرئيس
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Keith J. Laidler and John H. Meiser, "Physical Chemistry,,"	المؤلف
Houghton Mifflin Company, Boston,.	الناشر
2003	السنة
Fourth Edition	الطبعة
	الموقع الإلكتروني للمرجع

3. المراجع الإضافية (References) (وتشمل الكتب والبحوث المنشورة في الدوريات او المواقع الالكترونية)

Peter Atkins and Jolio de Paula, Atkins Physical chemistry, 7 th Ed, Oxford university press, 2002	-1
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