

توصيف مساق: Chem 403102

1. معلومات مدرس المساق (Instructor)

Basem Fares Ali	اسم (مدرس / منسق) المساق :
9-10 (Sun, Tue, Thur)	الساعات المكتتبة :
2142	رقم المكتب والرقم الفرعي :
bfali@aabu.edu.joi	البريد الالكتروني :
NA	مساعد البحث والتدريس/المشرف/الفني (إن وجد):

2. وصف المساق (Course Description)

The course covers the properties of solutions, the principles of chemical kinetics including the rates and mechanisms of chemical reactions, chemical equilibria, chemical thermodynamics, and electrochemistry.

3. بيانات المساق (Course Title)

المستوى: Year 1/ Level 2	اسم المساق: General Chemistry 2	رقم المساق: 403102
وقت المحاضرة: 8-9.30	المتطلب السابق / المتزامن: 403101	طبيعة المساق: نظري
عدد الساعات الدراسية: 3	الفصل الدراسي: Session 1- 2019/2020	العام الجامعي: 2019 / 2020

4. أهداف المساق (Course Objectives)

To introduce the basic principles of solutions, solubility, colligative properties, kinetics, chemical equilibrium, and applications of aqueous equilibria including acid-base equilibria and solubility product, thermodynamics, electrochemistry.	أ-
To reason mathematically and perform calculations to solve problems requiring a mathematical solution.	ب-
To enhance students ability of critical thinking, problem solving skills and to develop making critical decisions	ج-
To give the importance of chemistry principles and relevant connections to those principles operating in daily life	د-
To motivate positive and logical thinking and to understand the principles of nature related to discussed chemical principles.	هـ-

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. Express the basic chemical principles of intermolecular forces, solutions, kinetics, equilibria and thermodynamics.
2. Rationalize the physical properties of solid, liquid, and gas phases of matter based on intermolecular forces.
3. Apply scientific reasoning and analysis to solve scientific problems.
4. Recognize and deal with different types stoichiometric principles of different discussed topics.
5. Elucidate the basic concepts of acids and bases and applications.
6. Utilize the concepts of thermodynamics to explain solubility, kinetics, equilibria and electrochemistry.
7. Relate the daily life applications to the topics covered in general chemistry and other areas.

8. محتوى المساق (Course Content)

الموضوع	الأسبوع
Chapter 10: Liquids and Solids Intermolecular Forces; The Liquid State; Vapor Pressure And Changes of State; Phase Diagrams.	1 + 2
Chapter 11: Properties of Solutions Solution Composition; The Energies of Solution Formation; Factors Affecting Solubility; The Vapor Pressures of Solutions, Boiling Point Elevation And Freezing Point Depression; Osmotic Pressure, Colligative Properties of Electrolyte Solutions.	3 + 4
Chapter 12: Chemical Kinetics Reaction Rates; Rate Laws: An Introduction; Determining The Form Of The Rate Law; The Integrated Law; Rate Laws: A Summary; Reaction Mechanisms; A Model For Chemical Kinetics; Catalysis.	5 + 6
First Exam (week 6; Chapters 10-12)	
Chapter 13: Chemical Equilibrium The Equilibrium Condition; The Equilibrium Constant; Equilibrium Expression Involving Pressures; Heterogeneous Equilibria; Application Of Equilibrium Constant; Solving Equilibrium Problems; LeChatelier's Principle.	7 + 8
Chapter 14: Acids and Bases Acids And Bases; Acid Strength; The pH Scale; Calculating The pH Of Strong Acid Solutions; Calculating The pH Of Strong Base Solutions; Polyprotic Acids; Acid-Base Properties of Salts; The Effect Of Structure On Acid-Base Properties; Acid-Base Properties Of Oxides; The Lewis Acid-Base Model.	9 + 10
Chapter 15: Acid-Base Equilibria Solutions of Acids or Bases Containing A Common Ion; Buffered Solutions; Buffer Capacity; Titrations and pH curves; Acid-Base indicators.	10-11
Second Exam (week 12; Chapters 13-15)	

Chapter 16: Solubility and Complex Ion Equilibria: Solubility Equilibria and Solubility Product; Precipitation And Quantitative Analysis; Equilibria Involving Complex Ions.	11-12
Chapter 17: Spontaneity, Entropy and Free Energy Spontaneous Processes And Entropy; Entropy And Second Law Of Thermodynamics; The Effect Of Temperature On Spontaneity; Free Energy; Entropy Changes In Chemical Reactions; Free Energy And Chemical Reactions; The Dependence Of Free Energy On Pressure; Free Energy And Equilibrium.	13-14
Chapter 17: Electrochemistry Galvanic Cells; Standard Reduction Potentials; Cell Potential, Electrical Work, And Free Energy; Dependence Of Cell Potential On Concentration; Batteries; Corrosion; Electrolysis; Commercial Electrolytic Processes.	15
Final Exam (week 16; All material covered)	16

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	Express the basic chemical principles of intermolecular forces, solutions, kinetics, equilibria and thermodynamics.	- Power point Lectures - Problem solving - Oral discussions - Class room participation	- Class notes - Continuous discussion of the material - Problem sets and solutions. - Assignments	- Examination
2	Rationalize the physical properties of solid, liquid, and gas phases of matter based on intermolecular forces.	- Power point Lectures - Problem solving - Oral discussions - Class room participation	- Class notes - Continuous discussion of the material - Problem sets and solutions. - Assignments	- Examination
3	Apply scientific reasoning and analysis to solve scientific problems.	- Power point Lectures - Problem solving - Oral discussions - Class room participation	- Class notes - Continuous discussion of the material - Problem sets and solutions. - Assignments	- Examination
4	Recognize and deal with different types stoichiometric principles of	- Power point Lectures - Problem solving - Oral discussions	- Class notes - Continuous discussion of the material - Problem sets and solutions.	- Examination

	- Assignments	- Class room participation	different discussed topics	
- Examination	- Class notes - Continuous discussion of the material - Problem sets and solutions. - Assignments	- Power point Lectures - Problem solving - Oral discussions - Class room participation	Elucidate the basic concepts of acids and bases and applications	5
- Examination	- Class notes - Continuous discussion of the material - Problem sets and solutions. - Assignments	- Power point Lectures - Problem solving - Oral discussions - Class room participation	Utilize the concepts of thermodynamics to explain solubility, kinetics, equilibria and electrochemistry.	6
- Examination	- Class notes - Continuous discussion of the material - Problem sets and solutions. - Assignments	- Power point Lectures - Problem solving - Oral discussions - Class room participation	Relate the daily life applications to the topics covered in general chemistry and other areas.	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)

Chemistry	المرجع الرئيس
Steven S. Zumdahl, Susan A. Zumdahl	المؤلف
Mary Finch	الناشر
2014	السنة
Ninth edition	الطبعة
ISBN-10: 054705405X, ISBN-13: 9780547054056	الموقع الالكتروني للمرجع

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

Chemistry: The Central Science by Theodore E. Brown, H. Eugene LeMay, Bruce E. Bursten, Catherine Murphy, Patrick Woodward, Matthew E. Stoltzfus, Pearson, 14 th edition, 2017.	-1
General Chemistry: Principles and Modern Applications, by Ralph H. Petrucci, F. Geoffrey Herring, Jeffrey D. Madura, Carey Bissonette, Pearson, 11 th edition, 2017.	-2
Chemistry: The Molecular Nature of Matter, by James E. Brady, Neil D. Jespersen Alison Hyslop, John Wiley & Sons Inc; 7th edition, 2014.	-3