KOMAR UNIVERSITY OF SCIENCE AND TECHNOLOGY (KUST)

General Chemistry II			
Course Title	General Chemistry II and Lab		
Course Code	CHM2411C	**No. of Credits**	4
Department	Medical Laboratory Science (MLS)	**College**	Science
Pre-requisites Course Code	CHM 1410C	**Co-requisites Course Code**	
Course Coordinator(s)	Ms. Mariam Y. Merry		
Email	mariam.yacoub@komar.edu.iq	**IP No.**	
Other Course Teacher(s)/Tutor(s)	None		
Learning Hours	**For the Lecture time** Section 1: Sunday/Wednesday – 12:00-1:30 p.m class G-13-14 **For the Lab time** Section 1: Monday – 3:00-6:00 p.m. outside the building Section 2: Tuesday – 10:00 – 1:00 p.m. outside the building		
Contact Hours	By making an appointment via email Office location is in the second floor-Room 234		
Course Type	College Requirement		
Offer in Academic Year	**Spring 2016**		

COURSE DESCRIPTION

CHM 2411C is the second semester of general chemistry sequence for science majors, The course will include a discussion of the properties of solution, reaction kinetics, principles of chemical equilibria and basic principles of spectrophotometry, chemistry of environment and chemistry of life as an introduction to organic chemistry and biochemistry

COURSE OBJECTIVE

The objective of this course is to help students master the materials and develop the problem-solving and critical thinking skills required to assess and appreciate the impact of chemistry on important issues. Upon completion of the course, students will have a solid foundation in principles of chemistry and be prepared to progress on to more specialized topics in upper division courses of science and other disciplines.

KOMAR UNIVERSITY OF SCIENCE AND TECHNOLOGY (KUST)

COURSE LEARNING OUTCOMES

1. **Knowing/Remembering:** Students should be able to
   a. Recognize some properties for the solution like colligative properties (the boiling-point elevation and freezing-point depression of a solution) and some of the factors that affect the solubility like temperature, partial pressure, and solute-solvent interaction.
   b. Find the basic principles of chemical equilibria: acid-base (including polyprotic and weak acids/base), buffer system, and common-ion effect, complex-ion, and redox equilibria and find the equilibrium-constant expression for any reaction. (E)
2. **Comprehension/Understanding:** Students should be able to
   c. Explain the form and meaning of a rate law, including the ideas of reaction order and rate constant and determine the rate law and rate constant for a reaction from a series of experiments given the measured rates for various concentrations of reactants
   d. Understand the chemistry of the environment like Layers of the atmosphere, water, and green chemistry
   e. Describe the basic principles of spectrophotometry and its applications in chemical analysis.
   f. Understand the basics of organic and biochemistry molecules such as different organic functional groups, proteins, carbohydrates and lipids (E)
3. **Applications:** Students should be able to
   g. Calculate the concentration of a solution in terms of molarity, molality, mole fraction, percent composition, and parts per million and be able to interconvert between them.
   h. Use the various units of measurement, unit conversions, dimensional analysis, and stoichiometric calculations (E)
4. **Conduct experiments:**
   i. Students should be able to set and conduct experiments that linked to the Learning Outcomes. (E)

GUIDELINES ON GRADING POLICY

Points	*Percentage Scores*	*Grade*
A *A-*	*95–100* *90-94*	*4.0* *3.7*
B+ *B* *B-*	*87–89* *83-86* *80-82*	*3.3* *3.0* *2.7*
C+ *C* *C-*	*75–79* *70-74* *65-69*	*2.3* *2.0* *1.7*
D+ *D* *D-*	*60–64* *55-59* *50-54*	*1.3* *1.0* *0.7*
F	*0–49*	*0*
I	*Incomplete Course Work*	
W	*Official Withdrawal*	

KOMAR UNIVERSITY OF SCIENCE AND TECHNOLOGY (KUST)

COURSE TEACHING AND LEARNING ACTIVITIES

This course will carried out in 3 hrs theoretical and 3 hrs experimental per week. The semester has 15-instructional weeks followed by one week of final exam. Course instructor will:

- Utilize power point presentation to present the course information.
- The board space to calculate problems with students.
- There will be in class group work, where student will do in class exercises and turn the assignment to the instructor.

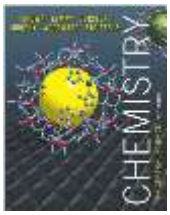
CELL PHONES

COURSE ASSESSMENT Tools

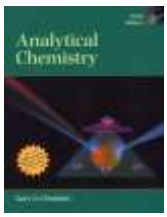
Assessment Method		Assessment Weight
Quizzes (4), (a, g, b, e)	Short quizzes are scheduled as shown in the semester schedule and all the quizzes will be counted.	10%
Tests (2) **T1= (a, c, g)…T2=(b, d)**	Two tests will be conducted during the semester and their average will be taken.	15%
Laboratory work	Laboratory experiments have been developed to coordinate with the content material. The detail of the 25% on page 6.	25%
Mid-term Exam (a, b, c, g)	The mid-term exam will be similar to the cases studied during the semester, but more updated.	20%
Final Exam (all)	The final exam will include all the course content and it is a closed book exam.	30%
Total		**100%**

Grading: Passing Grade: 65%

Textbooks:



Name of the Textbook: Chemistry: the Central Science, 13th Edition
Authors: Theodore E. Brown, H. Eugene H. LeMay, Bruce E. Bursten and Catherine Murphy.
Publisher: Pearson Education Inc.
ISBN-13: ISBN- 13: 978-0-321-91041-7
Year: 2014.



Name of the Textbook: Analytical Chemistry, 6th Edition
Authors: Gary D. Christian.
Publisher: John Wiley & Sons.Inc.
ISBN-13: 0-471-21472-8
Year: 2004.

References:

1. Title: Chemistry (International Edition)
Authors: John E. McMurry, Robert C. Fay.
Edition: 6th Edition
ISBN-13: 978-0-321-76087-6
Year: 2012

2. Title: Chemistry: a Molecular Approach
Authors: Nivaldo J. Tro, Chemistry
Edition: 3rd Edition
ISBN-13: 978-0-321-80924-7
Year: 2014

3.Title: Chemical Principles: the Quest for Insight
Authors: Atkins, Jones, Laverman
Edition: 6th Edition
ISBN-13: 978-1-4641-2467-9
Year: 2013

All cell phones, beepers and internet devices are expected to switch off completely. Disruption of class due to beepers or a cell phone is not allowable and the instructor will take the device from the student. All other electronic equipment that the faculty member deems not essential to the provision of academic learning is prohibited from being used in class

COURSE POLICY *(including plagiarism, academic honesty, attendance etc)*

Academic Dishonesty

Any type of dishonesty (plagiarism, copying another's test or home-work, etc) will NOT be tolerated. Students found guilty of any type of academic dishonesty are subject to failure in this course, plus further punishment by the University Consul.

Attendance:

- Students are expected to attend all lectures and must attend all examinations, quizzes, and practical exercises.
- There is no make-up work for students who miss classes without official permission.
- Student must arrange with the faculty to make-up the missed class.
- Students are subject to the regulation and policies mentioned in the KUST Student Handbook.

KUST guidelines for lateness are as follows: **Three occasions of lateness count as one absence**. (***You can be considered late after 5 minutes of the lecture time***).

GUIDELINES FOR SUCCESS

1. Work both independently and in groups of your study of peers, who can help you understanding the course material.
2. Pay a full attention in the class when your instructor explain the lesson, if you understand 70% directly from the instructor, then the 30% will be just practice exercises.
3. Understanding more than memorizing will help you a lot in passing exams.
4. Working many problems beyond the assigned homework will help mastering.
5. Ask a question when something is not clear.
6. Finally, attend every lecture and getting missed material is your responsibility.

REVISIONS TO THE SYLLABUS

This syllabus is subject to change. It is the duty of the instructor to inform students of changes in a timely fashion after approved by the Office of Quality Assurance Acreditaion (OQAA).

KOMAR UNIVERSITY OF SCIENCE AND TECHNOLOGY (KUST)

Course Schedule (Theory only)

Weeks	Topics	Ch.	Assignment
1	Introducing course syllabus, The Solution Process, Saturated Solution and Solubility, Factors Affecting Solubility,	13	
	Ways of Expressing Concentration,		
2	Colligative Properties		
	Factors that Effect Reaction Rate, The Rate Law	14	
3	The Change of Concentration with Time, Temperature and Rate, Reaction Mechanisms, Catalysts		**Quiz1**
	The Concept of Equilibrium and Equilibrium Constant	15	
	Nawroz Holiday		
4	Heterogeneous Equilibria, Calculating Equilibrium Constant,	15	
	Test 1: Ch. 13, 14		
5	Application of Equilibrium Constant, Le Châtelier's Principle	15	
	A Review for Acids and Bases, Brønsted-Lowry Definition, The Auto-ionization of Water, The pH Scale.	16	
6	Strong and Weak Acids and Bases, Relationship Between Ka and Kb.		
	Acid-Base Properties of Salt Solution, Acid-Base Behavior and Chemical Structure, Lewis Acid-Base		**Quiz2**
7	The Common Ion Effect, Acid-Base titration,	17	
Mid-Term Exam: Ch. 13, 14, 15			
8	**Labor day Holiday**		
	Buffered Solution, Solubility Equilibria	17	
9	Factors that affect solubility, Precipitation and Separation of Ions,		
	Interaction of electromagnetic radiation with matter, Quantitative calculations	***16**	**Quiz3**
10	Solvent for spectrometry,		
	Spectrometric Instrumentation		
11	Type of Instruments		
	Some General Characteristics of Organic Molecules, Introduction to Hydrocarbons, AlKanes, Alkenes, andAlkynes.	24	**Quiz4**
12	Organic Functional Groups, Chirality in Organic Chemistry		
	Introduction to Biochemistry, Proteins, Carbohydrates, Lipids, Nucleic Acid		
13	**Test 2: Ch. 16, 17, and *16**		
	Earth's Atmosphere, Outer Regions of the Atmosphere,	18	
14	Ozone in the Upper Atmosphere, chemistry of the Troposphere,		
	The World Ocean, Freshwater, Green Chemistry		
15	Review		
16	**Final Exam: All Chapters**		

KOMAR UNIVERSITY OF SCIENCE AND TECHNOLOGY (KUST)

General Chemistry II Lab

COURSE ASSESSMENT Tools

Assessment Method	Description	Assessment Weight
Pre-lab questions (4)	The pre-lab questions will be submitted as scheduled	**3%**
Quizzes (4)	Quizzes are scheduled as shown in the lab schedule below. All the quizzes grades will be counted toward your final lab grad.	**4%**
Lab reports (11)	Students will submit 11 reports; highest 10 laboratory grades will count toward your final lab grade	**10%**
Technique points	This part will be evaluated based on *following lab safety rules*, *attitude*, *ability to perform routine tasks in a timely manner*, and *neatness of the group place* including working area, used equipment and chemical).	**1%**
Final test	A final test will be designed to cover all the experiments' calculations, conclusions, title, drawing, and all questions related.	**7%**
Total		**25%**

Weeks	Topic	Linking Chapters	Activities
1	**we spent these two weeks for explaining theoretical principles to be a head in lecture rather than the lab**		
2			
3	**Experiment 1: Metathesis Reaction**	**Review CHM I**	
	Nawroz Holiday		
4	**Experiment 2: Factors Affecting Solubility and Making Solubility curve** *Lab report 1: Metathesis Reaction*	**13**	**Quiz 1** ***Pre-lab of Exp 1***
5	**Experiment 3: Freezing Point Depression and Molar Mass** *Lab report 2: Factors Affecting Solubility and Making Solubility curve*		***Pre-lab of Exp 2***
6	**Experiment 4: Kinetics-Iodine Clock** *Lab report 3***: *Freezing Point Depression and Molar Mass*	**14**	**Quiz 2**
7	**Experiment 5: Le Chatelier's Principle-Effect of Concentration/Effect of Concentration-Temperature** *Lab report 4: Kinetics-Iodine Clock*	**15**	
Mid	**No Lab during this week**		
8	**Experiment 6: Determining the Concentration of Citric Acid in 7-Up Using Acid-Base Titration** *Lab report 5: Le Chatelier's Principle-Effect of Concentration/Effect of Concentration-Temperature*	**16**	
9	**Experiment 7: Hydrogen Phosphate Buffer System** *Lab report 6: Determining the Concentration of Citric Acid in 7-Up Using Acid-Base Titration*	**17**	
10	**Experiment 8: Photometric Determination of an Equilibrium Constant** *Lab report 7: Hydrogen Phosphate Buffer System*	***16**	**Quiz 3** ***Pre-lab of Exp 11***

11	**Experiment 9: Properties and Reactions of Hydrocarbons** *Lab report 8: photometric Determination of an Equilibrium Constant*	**24**	***Pre-lab of Exp 8***
12	**Experiment 10: Protein, Carbohydrates, and Fats: Analysis of Peanut** *Lab report 9: Properties and Reactions of Hydrocarbons*		**Quiz 4**
13	**Experiment 11: Determination of Water Hardness** *Lab report 10: Protein, Carbohydrates, and Fats: Analysis of Peanut* ***Lab report 11: Determination of Water Hardness***	**18**	
14	**Final Test**		