



Course Specifications

Course Title:	Surface chemistry
Course Code:	4023554-3
Program:	Chemistry / Industrial Chemistry
Department:	Chemistry Department
College:	Applied Science
Institution:	Umm Al-Qura University

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A. Course Identification

1. Credit hours: 3
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: 6 th /3
4. Pre-requisites for this course (if any): Colloids and phase rule
5. Co-requisites for this course (if any): NA

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	√	74%
2	Blended		
3	E-learning	√	26%
4	Distance learning		
5	Other		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	22
2	Laboratory/Studio	30
3	Tutorial	--
4	Others (E-learning + Exams + office hours)	15
	Total	67

B. Course Objectives and Learning Outcomes

<p>1. Course Description</p> <ul style="list-style-type: none"> The theoretical part includes basic information about some hot topics in surface chemistry such as surface tension its determination and nature, surfactants, adsorption from gas and solutions,..... The practical part contains some practical experiments related to surface tension determination using different methods and by using some equipments and adsorption from solution
<p>2. Course Main Objective</p> <ul style="list-style-type: none"> Enable students to get information about surface tension and its determination and study the nature of solid surface. Also, the student should know the adsorption of gas on solid surface. The students will have good experience in doing some experiments related to surface chemistry

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Demonstrate broad knowledge and understanding of the underlying theories, principles, and concepts in surface chemistry.	K1
1.2	Identify the processes, practices, and/or chemical terminology in surface chemistry.	K2
s2	Skills :	
2.1	Apply the theories, principles, and concepts in various contexts in surface chemistry.	S1
2.2	Solve complex problems related to surface chemistry.	S2
2.3	use and adapt practical experiments in surface chemistry	S3
2.4	Collect a data using computers and internet to find all information related to surface chemistry and their applications	S5
3	Values:	
3.1	Work collaboratively and communication skills in class or laboratory discussions with responsibility.	V3

C. Course Content

No	List of Topics	Contact Hours
1	Introduction in surface tension and its determination	4
2	kelvin and young Laplace equations	2
3	Effect of temperature on surface tension and Parachor	2
4	Single crystal surface, simple and complex surface structures	2+2E
5	Relaxed, reconstructed, faceted surfaces	3+1E
6		
7	Bimetallic surfaces.	2+2E
8	Adsorption of gas on solid surfaces, and method of determination	4+2E
9	Frindlish, Langmuir and BET adsorption isotherms	3+1E
	Total	30
	Practical Part:	
1	Introduction to surface tension	3
2	Determination of the radius of the capillary tube using capillary rise method	3
3	Determination of the surface tension of different liquids using the capillary rise method.	3
4	Determination of the surface tension of water by the capillary rise method at different temperature	3
5	Determination of surface tension of liquids using capillary tubes of different diameters	3
6	Determination of the surface tension using tensiometer	3
7	Determination of surface tension using gyroscope	3
8	Determination of surface adsorption of amyl alcohol from aqueous solutions	3
9	Adsorption of Acetic acid on activated charcoal	3
10	Adsorption of oxalic acid on activated charcoal	3

Total	30
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D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		
1.1	Demonstrate broad knowledge and understanding of the underlying theories, principles, and concepts in surface chemistry.	Lectures	Mid-term and final written exams.
1.2	Identify the processes, practices, and/or chemical terminology in surface chemistry.	Lectures	Mid-term, oral and final written exams.
2.0	Skills		
2.1	Apply the theories, principles, and concepts in various contexts in surface chemistry.	Lectures E-Learning	Mid-term and final Exams Assignments and activities on blackboard
2.2	Solve complex problems related to surface chemistry.	Lectures E-Learning	Mid-term and final Exams Assignments and activities on blackboard
2.3	use and adapt practical experiments in surface chemistry	Lab work	Practical Lab exam
2.4	Collect a data using computers and internet to find all information related to surface chemistry and their applications	Lab work E-Learning	Practical Lab exam Assignments and activities on blackboard
3.0	Values		
3.1	Work collaboratively and communication skills in class or laboratory discussions with responsibility.	Lab work E-Learning	Practical Lab exam Assignments and activities on blackboard

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	E-learning	All weeks	5%
2	Assignments and activities	All weeks	5%
3	Mid-term Exam	6	20%
4	Practical Lab Work (Reports and Exams)	11	30%
5	Final Exam.(2 hours exam)	12	40%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

- Presence of faculty members to provide consulting and advice.
- Office hours: during the working hours weekly, and the creation of appropriate means.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<p>Surface Analysis: The Principal Techniques, 2nd Edition, John C. Vickerman, Ian Gilmore, Wiley, 2009.</p> <p>2. Surface Chemistry, Elaine M. Mc Cash , 1st ed., Oxford University Press, 2001.</p> <p>3. Introduction to Applied Colloid and Surface Chemistry, Georgios M. Kontogeorgis & Soren Kiil, WILEY, 2016</p> <p>4. Surface and Colloid Chemistry, Principles and Applications, K. S. Birdi, CRC Press, Taylor and Francis Group, 2010</p>
Essential References Materials	
Electronic Materials	<p>http://en.wikipedia.org/wiki/</p> <p>http://www.chemhelper.com/</p> <p>http://www.chemweb.com/</p> <p>http://www.sciencedirect.com</p>
Other Learning Materials	

2. Facilities Required

Item	Resources
<p>Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)</p>	classroom capacity (50) students.
<p>Technology Resources (AV, data show, Smart Board, software, etc.)</p>	Computer connected with Data show and TV
<p>Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)</p>	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment.	Program Leaders	Periodic review of final exams and the student's degrees in this course.
Extent of achievement of course learning outcomes.	Peer Reviewer	Checking selected exam papers, and student assignments.
Quality of learning resources	Students	Complete the questionnaire evaluation of the course in particular

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	

Head of Chemistry Department



Dr Moataz Morad

