

Kingdom of Saudi Arabia

The National Commission for

Academic Accreditation & Assessment



Course Specifications

Surface Chemistry

402343

Institution: Umm Al-qura University	Date of Report: 2015
College/Department : Faculty of Applied Science/ department of chemistry	

A. Course Identification and General Information

1. Course title and code: Surface Chemistry/402343		
2. Credit hours: 3(2+1)		
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Chemistry		
4. Name of faculty member responsible for the course: Dr Abdel Rahman Salah Khder		
5. Level/year at which this course is offered: 5th level/3rd year		
6. Pre-requisites for this course (if any) colloidal chemistry & phase rule		
7. Co-requisites for this course (if any) -----		
8. Location if not on main campus -----		
9. Mode of Instruction (mark all that apply)		
a. Traditional classroom	<input checked="" type="checkbox"/>	What percentage? 70 %
b. Blended (traditional and online)	<input type="checkbox"/>	What percentage? <input type="text"/>
c. e-learning	<input type="checkbox"/>	What percentage? <input type="text"/>
d. Correspondence	<input type="checkbox"/>	What percentage? <input type="text"/>
f. Other Practical	<input checked="" type="checkbox"/>	What percentage? 30 %
Comments:		

B Objectives

1. What is the main purpose for this course?

By the end of this course student will be able to:

- describe the fundamental principles of surface chemistry
- describe the basic concepts of surface tension,
- State the fundamental postulates of theories and equations gas adsorption theories.
- Able to measure the surface tension of any liquid
- Able to remove the pollutants from water by char coal.

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Surface tension and free surface energy	1	2
Measurements of surface tension	1	2
Contact angle and work of adhesion and work of cohesion- Dupres equation	1	2
Equations of Kelvin, Laplace and Young	1	2
Adsorption, adsorption of gases by solids	1	2
Adsorption isotherms	1	2
Theories of adsorption isotherms (Frundlish, Langmuir, Langmuir-Hinshelwood,.....)	1	2
BET equation	1	2
Experimental methods of Gas adsorption for determining all parameters of surface properties including surface area	1	2
Adsorption and Heterogeneous catalysis	1	2
catalyst poisoning and types	1	2
Examples of heterogeneous catalysis mechanisms and kinetics	1	2

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	24		36			60
Credit	2		1			3

3. Additional private study/learning hours expected for students per week.	<input type="text"/>
--	----------------------

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy
--

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Recognize meaning of surface tension	<ul style="list-style-type: none"> • Lectures • Scientific discussion • Library visits • Web-based study 	<ul style="list-style-type: none"> • Exams • web-based student performance systems • portfolios • long and short essays • posters lab manuals
1.2	Identify the different methods of measurement of surface tension		
1.3	Know work of adhesion and work of cohesion		
1.4	Describe the Equations of Kelvin, Laplace and Young		
1.5	Identify the adsorption of gases by solids		
1.6	Recognize the Adsorption isotherms		
1.7	Identify the different Theories of adsorption		
1.8	Determine the experimental methods of Gas adsorption		
1.9	Recognize the Heterogeneous catalysis		
1.10	Know catalyst poisoning and types		
1.11	Know Examples of heterogeneous catalysis mechanisms		
2.0	Cognitive Skills		
2.1	Predict the origin surface tension of different liquids	<ul style="list-style-type: none"> • Lectures • Scientific discussion • Library visits • Web-based study 	<ul style="list-style-type: none"> • Exams • web-based student performance systems • portfolios • posters • demonstrations
2.2	Compare between tension of different liquids		
2.3	Compare between the different strategies for surface tension determination		
2.4	Analyze the Equations of Kelvin, Laplace and Young		
2.5	Compare between the adsorption and adsorption isotherms of gases by solids		
2.6	Compare between the different methods for adsorption determination		
2.7	Give concise about heterogeneous catalysis and its poisoning		

3.0	Interpersonal Skills & Responsibility		
3.1	Manage resources, time and collaborate with members of the group.	1. Team work groups for cooperative work making. 2. Presenting the analysis and interpretation of a case study for each group to the other groups in class. 3.Open a general discussion with students in the area of educational issues for knowledge transfer between the students.	1.Writing group scientific report for a case study. 2.Assessment of the solution of problems submitted by the students.
3.2	Use university library and web search engines for collecting information and search about different topics .		
4.0	Communication, Information Technology, Numerical		
4.1	Work effectively both in a team, and independently on solving chemistry problems.	1. Write a Report 2.Use digital libraries and/or E-Learning Systems for the communication with lecturer through the course work	1.Evaluating the activities of the students through the semester for their activities on the E-learning system, as well as, their communication with each other in different tasks. 2.Evaluation of the report presented
4.2	Communicate effectively with his lecturer and colleagues		
4.3	Use IT and web search engines for collecting information.		
4.4			
5.0	Psychomotor		
5.1	NOT APPLICABLE		
5.2			

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Exam	5-14	20%
2	Assignments, reports,.....		10
3	Practical Exam	15	30%

4	Final Exam	16	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- **We have faculty members to provide counseling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic Advising for students.**

E. Learning Resources

1. List Required Textbooks

- 1- **Handbook of Applied Surface and Colloid Chemistry, Vol. 1-2, Holmberg, Krister, John Wiley & Sons, 2002, New York**
- 2- **Emulsions, Foams, and Suspensions: Fundamentals and Applications, Laurier L. Schramm, WILEY-VCH Verlag GmbH & Co, 2005, K Ga A, Weinheim**

2. List Essential References Materials (Journals, Reports, etc.)

- **Lecture Handouts available on the coordinator website**

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

- 1- **Handbook of Applied Surface and Colloid Chemistry, Vol. 1-2, Holmberg, Krister, John Wiley & Sons, 2002, New York**
- 2- **Emulsions, Foams, and Suspensions: Fundamentals and Applications, Laurier L. Schramm, WILEY-VCH Verlag GmbH & Co, 2005, K Ga A, Weinheim**

4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)

- **<http://www.chemweb.com>**
- **<http://www.sciencedirect.com>**
- **<http://www.rsc.org>**

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

- **Classrooms capacity (30) students.**
- **Providing hall of teaching aids including computers and projector**

2. Computing resources (AV, data show, Smart Board, software, etc.)
▪ Room equipped with computer and projector and TV.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)
• No other requirements

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor
<ul style="list-style-type: none"> • Observations and the assistance of colleagues. • Independent evaluation for extent to achieve students the standards. • Independent advice of the duties and tasks.
3 Processes for Improvement of Teaching
<ul style="list-style-type: none"> • Workshops for teaching methods. • Continuous training of member staff. • Review of strategies proposed. • Providing new tools for learning. • The application of e-learning. • Exchange of experiences internal and external.
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)
<ul style="list-style-type: none"> ▪ Check marking of a sample of exam papers, or student work. ▪ Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.

2

0

1

6

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Periodic Review of the contents of the syllabus and modify the negatives.**
- **Consult other staff of the course.**
- **Hosting a visiting staff to evaluate of the course.**
- **Workshops for teachers of the course.**

Faculty or Teaching Staff: Dr Abdel Rahman Salah Khder

Signature: _____ **Date Report Completed: 2015**

Received by: Dr Hatem Altass

Dean/Department Head

Signature: _____ **Date:** _____

2

0

1

6