

ATTACHMENT 5.

Kingdom of Saudi Arabia
**The National Commission for Academic Accreditation &
Assessment**

T6. Course Specifications
(CS)

**Advanced Surface and
Catalysis Chemistry**

(402644-3)



Course Specifications

Institution: Umm Al-qura University	Date: 2017
College/Department: Faculty of Applied Sciences / Department of Chemistry	

A. Course Identification and General Information

1. Course title and code: Advanced Surface and Catalysis Chemistry / 402644-3	
2. Credit hours: 3 hrs (theoretical)	
3. Program(s) in which the course is offered. M. Sc. in Chemistry (If general elective available in many programs indicate this rather than list programs)	
4. Name of faculty member responsible for the course: Prof. Abd El Rahman Salah Khder	
5. Level/year at which this course is offered: 3rd / 2nd	
6. Pre-requisites for this course (if any): not applicable	
7. Co-requisites for this course (if any): not applicable	
8. Location if not on main campus: El-Abedyah, El-Azizya, and El-Zaher	
9. Mode of Instruction (mark all that apply)	
a. traditional classroom	<input type="checkbox"/> What percentage? <input type="checkbox"/>
b. blended (traditional and online)	<input checked="" type="checkbox"/> What percentage? 100 %
c. e-learning	<input type="checkbox"/> What percentage? <input type="checkbox"/>
d. correspondence	<input type="checkbox"/> What percentage? <input type="checkbox"/>
f. other	<input type="checkbox"/> What percentage? <input type="checkbox"/>
Comments:	

B Objectives

1. What is the main purpose for this course?

The objectives of this course are to enable students to study in details the surface properties of Liquid- liquid, liquid-solid and gas –solid interfaces. Also the student will study homogeneous and heterogeneous catalysis and their applications in fine chemicals preparations and industrial applications.

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)

- Updating the course content with the techniques that will be recently introduced in the field.
- Increasing the use of E-learning.

C. Course Description (Note: General description in the form used in Bulletin or handbook)

Course Description:

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Surface tension, liquid interface	1	3
Surface properties of liquids, work of Adhesion and cohesion. Surface films on liquid substrates (spreading of one liquid on another).	2	6
Solid surfaces, the surface area, BET equation	1	3
Adsorption isotherms, Langmuir adsorption theory. Physical adsorption-surface area measurements	2	6
Fundamentals of catalysis and types of catalysis	1	3
Homogenous catalysis the principles and applications of homogeneous catalysis in fine chemicals	2	6



Heterogeneous catalysis, the principles and applications, conversion and selectivity, catalyst deactivation.	2	6
Catalyst manufacture	2	6

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	13	-	-	-	-	39
Credit	3					3

3. Additional private study/learning hours expected for students per week.

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

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Determine the surface area of the solid from data of adsorption	• Lectures	• Exams

1.2	Recognize the types of catalysis	<ul style="list-style-type: none"> • Scientific discussion 	<ul style="list-style-type: none"> • Oral question
1.3	Write the methods of catalyst preparation		
2.0	Cognitive Skills		
2.1	Apply the adsorption equations to practical data	<ul style="list-style-type: none"> • Using brain storming at the beginning of each lecture. • Enhancing open discussion during the lecture. 	<ul style="list-style-type: none"> • Exams • Oral question • Quick quizzes
2.2	Compare between homogeneous and heterogeneous catalysis.		
3.0	Interpersonal Skills & Responsibility		
3.1	Use adsorption equations in problem solving.	<ul style="list-style-type: none"> • Encourage the solving problems in groups • Making open discussion 	<ul style="list-style-type: none"> • Homework • Group reports
3.2	Use the laws to calculate TOF and TON Evaluate the role of catalyst in the reaction		
4.0	Communication, Information Technology, Numerical		
4.1	Calculate the reaction yields and product selectivity	<ul style="list-style-type: none"> • Encourage the solving problems in groups • Making open discussion 	<ul style="list-style-type: none"> • Exams • Homework • Group reports
4.2	Demonstrate the methods used in adsorption.		
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	Assignments and activities.	--	10 %
2	Midterm Exam.	8	30 %
3	Final Exam.	15-16	60 %
4	Total		100 %

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)

- 2 hours per week as office hours are available for discussion with the students.
- We have faculty members to provide consulting and academic advice.

E Learning Resources

1. List Required Textbooks

- Catalysis Concepts and Green Applications, Gadi Rothenberg , John Wiley & Sons, 2008.
- Industrial Catalysis: A Practical Approach, Second Edition. Jens Hagen WILEY VCH Verlag GmbH & Co. KGaA, Weinheim, 2006, ISBN: 3-527-31144-0.

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

Any journals in the field of the course will be considered.

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

Surface Analysis: The Principal Techniques, 2nd Edition, John C. Vickerman, Ian Gilmore, Wiley, 2009.

Introduction to Surface Chemistry and Catalysis, Gabor. A. Samorgi, 2nd ed., L. Yimin, Wiley, 2010.

4. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

<http://en.wikipedia.org/wiki/>

<http://www.chemhelper.com/>

<http://www.chemweb.com>

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

Microsoft PowerPoint, Microsoft Word

Videos on the chemistry of surfaces.

Educational CD for surface Chemistry correlated with other themes

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 with enough student's capacity.

2. Computing resources (AV, data show, Smart Board, software, etc.)

Hall equipped with a computer and the Data Show and Television is urgently required

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) : Non

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

Scheduled to complete the questionnaire calendar in particular.

Focus group discussions with small groups of students.

2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department

- Independent evaluation of the extent to which students of the standards.

- independent advice to the duties and tasks

3 Processes for Improvement of Teaching

- Workshops for the teaching methods.

- Continuous training for the faculty member.

- Revision of the proposed strategies.

- The provision of modern tools necessary for learning.

- Application of the means of e-learning.

- Exchange of internal and external experiences
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)
- Checking the samples of test papers, or student work, which has been corrected by a faculty member.
 - Exchange professors from different educational institutions on regular basis to correct samples of test papers
- 5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.
- Consult with other professors teaches the same subject.
 - Hosting a visiting professor to evaluate the subject.
 - Workshops for teachers whom teach the same subject.
 - Periodic review for teachers to modify the negatives contents in the subject.

Name of Instructor: _Prof. Abdel Rahman Salah Khder_____

Signature:_____Date Report Completed:___15/1/2017__

Name of Field Experience Teaching Staff _____

Program Coordinator:_____

Signature:_____Date Received:_____

