



ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

**Course Specifications
(CS)**

Chemistry of Catalysts

4023563-3





Course Specifications

Institution Umm Al-Qura University	Date of Report:
College/Department Applied Science /Chemistry Department	

A. Course Identification and General Information

1. Course title and code: Chemistry of Catalysis / 4023563-3	
2. Credit hours 3 (2 theoretical + 1 practical)	
3. Program(s) in which the course is offered. Chemistry (If general elective available in many programs indicate this rather than list programs)	
4. Name of faculty member responsible for the course: Prof. Dr Abd El Rahman Khedr	
5. Level/year at which this course is offered: 7th /4	
6. Pre-requisites for this course (if any) Surface chemistry	
7. Co-requisites for this course (if any).....	
8. Location if not on main campus: both on El-Abedyah and El-Zaher	
9. Mode of Instruction (mark all that apply)	
a. Traditional classroom	<input checked="" type="checkbox"/> What percentage? 100%
b. Blended (traditional and online)	What percentage? <input type="checkbox"/>
c. e-learning	What percentage? <input type="checkbox"/>
d. Correspondence	What percentage? <input type="checkbox"/>
f. Other	What percentage? 30% <input type="checkbox"/>
Comments:	



B Objectives

<p>1. What is the main purpose for this course?</p> <p>The basic objectives of this course are to study an introduction on catalysis and the methods of catalysts preparation. Homogeneous and heterogeneous catalysis. The student also will study the most recent spectroscopic and microscopic tools of catalyst characterization. Also, the student will study some applications of catalytic process</p>
<p>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)</p> <p>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.</p>

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
Introduction (The phenomenon catalysis, mode of action of catalysts, activity, turnover Frequency TOF, turnover number TON [T 46], selectivity, stability, classification of catalysts and comparison of homogeneous and heterogeneous catalysis).	2	4
Economic importance of catalysts. Methods of catalyst preparation	3	6
exam	1	2
Some spectroscopic and microscopic tools of catalyst characterization.	2	4
Examples include catalysts for oxidation, including pollution clean-up; hydrogenation including hydrogenation and refining processes	3	6
Pollution control with particular reference to car exhausts	2	4
exam	1	2

2. Course components (total contact hours and credits per semester)						
	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	28		42			70
Credit	2		1			3



3. Additional private study/learning hours expected for students per week. 2hr

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 the types of catalysis	<ul style="list-style-type: none"> Lectures Scientific discussion 	Exams web-based student performance systems
1.2	Write the methods of catalyst preparation		
1.3	Define the catalyst activity, selectivity, TOF, TON....		
2.0	Cognitive Skills		
2.1	Compare between homogeneous and heterogeneous catalysis	<ul style="list-style-type: none"> Lectures Scientific discussion 	Exams web-based student performance systems
2.2	Compare different methods of catalyst preparation		
1.3	Compare between catalytic reactors		
3.0	Interpersonal Skills & Responsibility		
	<ul style="list-style-type: none"> Ability to work in a team to perform a specific experimental tasks. Ability to work independently to handle chemicals Ability to communicate results of work to classmate and participation in class or laboratory discussions 	<ul style="list-style-type: none"> Class discussions Research activities 	<ul style="list-style-type: none"> Performance on in-practical exams. Work on research activity. Overall student performance in Lab. discussions Cross questions after finishing laboratory work
4.0	Communication, Information Technology, Numerical		
	<ul style="list-style-type: none"> Calculate the reaction yields and product selectivity Select suitable reactor for certain reaction Able to calculate and discuss the facts and logical propose methods to solve the difficulties. Use IT and communication technology in gathering and interpreting information and ideas. 	Lab, Lectures	web-based student performance systems individual and group presentations
5.0	Psychomotor		



5.1	<ul style="list-style-type: none"> Ability to work in a team to perform a specific experimental tasks. Ability to work independently to handle chemicals Ability to communicate results of work to classmate and participation in class or laboratory discussions 	<ul style="list-style-type: none"> Class discussions Research activities 	<ul style="list-style-type: none"> Performance on in-practical exams. Work on research activity. Overall student performance in Lab. discussions Cross questions after finishing laboratory work
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	Homework or activities.	--	10 %
2	Midterm Exam.	8	20 %
3	Practical Exam.	14	30 %
4	Final Exam.(2 hours exam)	16	40 %
5	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)
- **Presence of faculty members to provide consulting and advice.**
 - **Office hours: during the working hours weekly, and the creation of appropriate means.**

E. Learning Resources

1. List Required Textbooks

- Catalysis Concepts and Green Applications, Gadi Rothenberg , **John Wiley & Sons, 2008.**
- Catalysis for Renewables From Feedstock to Energy Production, Gabriele Centi and Rutger A. van Santen, WILEY-VCH Verlag GmbH & Co.KGaA, Weinheim, **2007.**
- Synthesis of Solid Catalysts, Krijn P. de Jong, WILEY-VCH Verlag GmbH & Co.KGaA, Weinheim, **2007.**
- Industrial Catalysis: A Practical Approach, Second Edition. Jens Hagen WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim, **2006**, ISBN: 3-527-31144-0.



<p>5. B. Cornils, W. A. Herrmann, R. Schlögl, C.-H. Wong Catalysis from A to Z A Concise Encyclopedia 2nd ed 2003, ISBN 3-527-30373-1</p> <p>6. Catalytic Air Pollution Control: Commercial Technology, Johnson Matthey PLC, Orchard Road, Royston, Hertfordshire SG8 5HE, UK; 2010</p>
<p>2. List Essential References Materials (Journals, Reports, etc.)</p>
<p>3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)</p> <p>1. Catalysis Concepts and Green Applications, <u>Gadi Rothenberg</u> , John Wiley & Sons, 2008.</p> <p>2. Catalysis for Renewables From Feedstock to Energy Production, Gabriele Centi and Rutger A. van Santen, WILEY-VCH Verlag GmbH & Co.KGaA, Weinheim, 2007.</p> <p>3. Synthesis of Solid Catalysts, Krijn P. de Jong, WILEY-VCH Verlag GmbH & Co.KGaA, Weinheim, 2007.</p> <p>4. Industrial Catalysis: A Practical Approach, Second Edition. Jens Hagen WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim, 2006, ISBN: 3-527-31144-0.</p> <p>5. B. Cornils, W. A. Herrmann, R. Schlögl, C.-H. Wong Catalysis from A to Z A Concise Encyclopedia 2nd ed 2003, ISBN 3-527-30373-1</p> <p>6. Catalytic Air Pollution Control: Commercial Technology, Johnson Matthey PLC, Orchard Road, Royston, Hertfordshire SG8 5HE, UK; 2010</p>
<p>4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)</p> <p>http://en.wikipedia.phys/wiki/Petroleum1 -http://www.chemhelper.com/ - http://www.chemweb.com</p>
<p>5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.</p> <p>Microsoft PowerPoint, Microsoft Word</p> <p>-Videos on the chemistry of surfaces.</p> <p>- Educational CD for surface Chemistry correlated with other themes</p>

F. Facilities Required

<p>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.)</p>
<p>1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)</p> <p>-classroom capacity (30) students.</p>



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)

No other requirements

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 Program/Department Instructor
Feedback and assistance from colleagues.

- 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

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.

Faculty or Teaching Staff: Prof. Dr Abd El Rahman Khedr

Signature:  Date Report Completed: 12/1/2019

Received by: Dr. Ismail Althagafi

Department Head

Signature: 

Date: 20/1/2019

