Kingdom of Saudi Arabia

The National Commission for

Academic Accreditation & Assessment

Course Specifications

Advanced Kinetic Chemistry

402445-2

Institution: **Umm Al-qura University**	Date of Report: **2016**
College/Department : **Faculty of Applied Science/ department of chemistry**	

A. Course Identification and General Information

1. Course title and code: **Advanced Kinetic Chemistry / 402445-2**			
2. Credit hours: **3 (2+1)**			
3. Program(s) in which the course is offered. **Chemistry program**			
4. Name of faculty member responsible for the course: **Dr. Ahmed Fawzy Saad**			
5. Level/year at which this course is offered: **7th level/4th year**			
6. Pre-requisites for this course (if any): **Surface Chemistry / 402343**			
7. Co-requisites for this course (if any)---			
8. Location if not on main campus: **both in El-Abdyah(boys side) and El-Zaher (girls side)**			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom		What percentage?	
b. **Blended (traditional and online)**	■	What percentage?	**100%**
c. e-learning		What percentage?	
d. Correspondence		What percentage?	
f. Other		What percentage?	

Comments:

B Objectives

1. What is the main purpose for this course?

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

1. Describe the different types of complex reactions.
2. Develop the kinetics of different types of complex reactions.
3. Write the kinetics of catalysis by enzymes.
4. State the photochemical reactions.
5. Describe the fundamentals of reactions in solutions.

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)

1. Encourage students to make reports in the field of kinetic chemistry from the library or using the Internet.
2. Use the 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
Classification of reactions - kinetics of complex reactions - reversible reactions and examples.	**1**	**2**
Kinetics of parallel reactions and consecutive reactions and examples.	**1**	**2**
Kinetics of chain reactions and examples.	**1**	**2**
Kinetics of heterogeneous catalytic reactions and their applications.	**1**	**2**
Adsorption and its types – its relation with the kinetics of heterogeneous catalytic reactions.	**1**	**2**
Surface reactions, types and examples.	**1**	**2**
Enzymes, mechanism of enzymatic reactions and factors affecting them.	**1**	**2**
General revision and First Periodical Exam.	**1**	**2**
Kinetics of catalysis by Enzymes.	**1**	**2**
Photochemical reactions and examples.	**1**	**2**
Kinetics and mechanism of photochemical reactions.	**1**	**2**
Reactions in solutions and factors affecting them.	**2**	**4**
Kinetics and mechanism of reactions in solutions.	**1**	**2**
General revision and Second Periodical Exam.	**1**	**2**
Final Exam.	**1**	**2**

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	32	-	-	-	-	32
Credit	2	-	-	-	-	2

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

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	List the various types of complex reactions.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays • posters lab manuals
1.2	Define the different complex reactions and their rate laws.		
1.3	Mention the two types of catalytic reactions and their applications.		
1.4	Explain the kinetics and mechanism of catalysis by enzymes.		
1.5	Explain the kinetics and mechanism of photochemical reactions.		
1.6	Describe the factors affecting the reactions in solutions and their kinetics.		
2.0	**Cognitive Skills**		
2.1	Compare between the different types of complex reactions.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • posters • demonstrations
2.2	Solve the rate-law expressions for different complex reactions.		
2.3	Compare between the two types of catalytic reactions.		
2.4	Give a concise interpretation of the mechanism of catalysis by enzymes - mechanism of photochemical reactions.		
2.5	Interpret the kinetics of reactions in solutions and the factors affecting it.		

3.0	**Interpersonal Skills & Responsibility**		
3.1	Manage resources, time and collaborate with members of the group.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems
3.2	Use the library and internet 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 the kinetic chemistry problems.	• Lectures • Scientific discussion • Library visits • Web-based study	• web-based student performance systems • individual and group presentations
4.2	Communicate effectively with his lecturer and colleagues		
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	Weakly	10%
2	First Periodical Exam	8	20%
3	Second Periodical Exam	15	20%
4	Final Exam	16	50%

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 counselling and academic advice.
- 2 hours per week as office hours are available for discussion with the students.

E. Learning Resources

1. List Required Textbooks * An Introduction to Chemical Kinetics, Margaret Robson Wright, New York, John Wiley & Sons, 2004. * Kinetics of Chemical Reactions, Guy Marin, Gregory S. Yablonsky, John Wiley, 2011. * Chemical Kinetics, J. Laidler, 4th ed., John Wiley & Sons, 1994.
2. List Essential References Materials (Journals, Reports, etc.) * Lecture Hand outs available on the coordinator website
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) * Physical Chemistry, Amazon logo *Silbey, R. R. Alberty, M. Bawendi, 4th ed., John Wiley & Sons, 2004.* * Physical Chemistry, Peter Atkins & Julio de Paula, 10th *ed., W. H. Freeman* and *Company, 20*14. * Catalytic Chemistry, Bruce C. Gates, New York, John Wiley & Sons, 1992.
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • http//:en.wikipedia.org/wiki/ • http//:www.chemweb.com/ • Websites on the internet relevant to the topics of the course
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.) * Appropriate teaching class including white board and data show with at least 25 seats.

2. Computing resources (AV, data show, Smart Board, software, etc.) * Computer Halls access for the students will be helpful in doing their tasks during the course.
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 • Student discussion with the instructor allow for continuous feed back through the course progress. • Student Evaluation Questionnaires.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • Discussions within the group of faculty teaching the course.

- Peer consultation on teaching strategies and its effectiveness.

3 Processes for Improvement of Teaching

- Workshops given by experts on new teaching and learning methodologies will be attended.
- Improving of the teaching strategies by monitoring the evaluation of the students progress through the semester

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)

- Not effective yet.

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

- The course will be evaluated periodically after each semester based on the results of the students and the report presented by the teaching stuff that will be discussed with the course coordinator so as to improve the course.

Faculty or Teaching Staff: Dr. Ahmed Fawzy

Signature: 

Date Report Completed: 2016