



ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

**Course Specifications
(CS)**

Course code :	CHEM 332
Course title :	Chemical Kinetics
Date :	30/12/2015



Course Specifications

Institution	King Saud University	Date of Report	30/12/2015
College/Department			

A. Course Identification and General Information

1. Course title and code:	Chemical Kinetics (CHEM 332)		
2. Credit hours: 3 (2 + 0 + 1)			
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs)	BSc in Chemistry		
4. Name of faculty member responsible for the course	Prof. Ahmed Aouissi / Dr Abdelrazig Elfaki		
5. Level/year at which this course is offered	6th level/Third year		
6. Pre-requisites for this course (if any)	CHEM 103, CHEM 107, CHEM. 231		
7. Co-requisites for this course (if any)	none		
8. Location if not on main campus	King Saud university: Main campus & Girls Campus		
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom	<input type="checkbox"/> Yes	What percentage?	<input type="text" value="75%"/>
b. Blended (traditional and online)	<input type="checkbox"/> Yes	What percentage?	<input type="text" value="25%"/>
c. e-learning	<input type="checkbox"/> No	What percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/> No	What percentage?	<input type="text"/>
f. Other	<input type="checkbox"/> No	What percentage?	<input type="text"/>
Comments:			



B Objectives

1. What is the main purpose for this course?

- Understanding the basic principles of chemical kinetics.
- Developing the related mathematical skills of the student.
- Relating the theoretical aspects of the course to the experimental results.
- Knowing the applications of kinetics in industry and life in general.

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)

- Using useful programs such as excel in drawing the different kinds of plots in chemical kinetics.
- Getting use of the international net in the related subjects of chemical kinetics.
- Introduction of use of computer in the data processing is becoming a must in the data analysis needed for the laboratory experiments.
- Putting lectures, exercises, old exams, etc. in the web site of the instructor of chemical kinetics

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
Reaction rate and factors affecting the chemical rate.	2	6
Simple reactions	4	12
Experimental methods of measuring reaction rate.	2	6
Kinetics of complex reactions	2	6
Arrhenius equation.	1	3
Collisions theory	1	3
Transition state theory	1	3
Classification and application of catalyst	1	3



2. Course components (total contact hours and credits per semester):						42
	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	28	28		None		56
Credit	28					28

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

2

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

Course Learning Outcomes, Assessment Methods, and Teaching Strategy work together and are aligned. They are joined together as one, coherent, unity that collectively articulate a consistent agreement between student learning, assessment, and teaching.

The *National Qualification Framework* provides five learning domains. Course learning outcomes are required. Normally a course has should not exceed eight learning outcomes which align with one or more of the five learning domains. Some courses have one or more program learning outcomes integrated into the course learning outcomes to demonstrate program learning outcome alignment. The program learning outcome matrix map identifies which program learning outcomes are incorporated into specific courses.

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. **Fourth**, if any program learning outcomes are included in the course learning outcomes, place the @ symbol next to it.

Every course is not required to include learning outcomes from each domain.



	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	<ul style="list-style-type: none"> Define the basic mathematical skills related to this course. State the different kinds of equations involved in this course and find the important kinetic parameters. Recognize the suitable experimental methods for following a chemical reaction kinetically. Record the mathematical derivation skills of the student. 	In class lecturing where current topics are interrelated the past and future topics. Basic principles, instrumental design and application of each technique are discussed with students.	<ul style="list-style-type: none"> In-class quizzes, majors and final exams Homework assignments
1.2			
2.0	Cognitive Skills		
2.1	<ul style="list-style-type: none"> Develop thinking during lectures by giving some pop questions. Analyze the related slides obtained from the net Evaluate homework assignments. Plan In-class short exams. 	1- homework assignment 2- solving problems 3- group discussion of related problems.	
2.2			
3.0	Interpersonal Skills & Responsibility		
3.1	<ul style="list-style-type: none"> Evaluate Students work effectively individually and in teams in classroom. Judge students in group discussions Analyze Group and individual assignments 	<ul style="list-style-type: none"> Working independently and in groups towards some case studies. Collect literature reports , summarize, analyse and interpret the main findings. Manage resources, time and other members of the group Communicate results of work to others 	<ul style="list-style-type: none"> Individual performance within a group In-class problems solving. Individual performance during lectures.



		through written reports and oral presentations.	
3.2			
4.0	Communication, Information Technology, Numerical		
4.1	<ul style="list-style-type: none"> Interpret numerical, chemical and general scientific information. Demonstrate oral communication skills, especially the ability to transmit complex technical information in a clear and concise manner. Interpret computers results for chemical simulation and computation, and database usage. Use and interpret chemical literature. 	<ul style="list-style-type: none"> Homework assignments In-class exams Usage of computer and chemical software packages for kinetic chemistry applications 	<ul style="list-style-type: none"> Performance in the problem solving assigned in the homework Quizzes
4.2			
5.0	Psychomotor		
5.1	Not applicable		

Suggested Guidelines for Learning Outcome Verb, Assessment, and Teaching

NQF Learning Domains	Suggested Verbs
Knowledge	list, name, record, define, label, outline, state, describe, recall, memorize, reproduce, recognize, record, tell, write
Cognitive Skills	estimate, explain, summarize, write, compare, contrast, diagram, subdivide, differentiate, criticize, calculate, analyze, compose, develop, create, prepare, reconstruct, reorganize, summarize, explain, predict, justify, rate, evaluate, plan, design, measure, judge, justify, interpret, appraise
Interpersonal Skills & Responsibility	demonstrate, judge, choose, illustrate, modify, show, use, appraise, evaluate, justify, analyze, question, and write
Communication, Information Technology, Numerical	demonstrate, calculate, illustrate, interpret, research, question, operate, appraise, evaluate, assess, and criticize
Psychomotor	Not applicable



Suggested **verbs not to use** when writing measurable and assessable learning outcomes are as follows:

Consider Maximize Continue Review Ensure Enlarge Understand
Maintain Reflect Examine Strengthen Explore Encourage Deepen

Some of these verbs can be used if tied to specific actions or quantification.

Suggested assessment methods and teaching strategies are:

According to research and best practices, multiple and continuous assessment methods are required to verify student learning. Current trends incorporate a wide range of rubric assessment tools; including web-based student performance systems that apply rubrics, benchmarks, KPIs, and analysis. Rubrics are especially helpful for qualitative evaluation. Differentiated assessment strategies include: exams, portfolios, long and short essays, log books, analytical reports, individual and group presentations, posters, journals, case studies, lab manuals, video analysis, group reports, lab reports, debates, speeches, learning logs, peer evaluations, self-evaluations, videos, graphs, dramatic performances, tables, demonstrations, graphic organizers, discussion forums, interviews, learning contracts, antidotal notes, artwork, KWL charts, and concept mapping.

Differentiated teaching strategies should be selected to align with the curriculum taught, the needs of students, and the intended learning outcomes. Teaching methods include: lecture, debate, small group work, whole group and small group discussion, research activities, lab demonstrations, projects, debates, role playing, case studies, guest speakers, memorization, humor, individual presentation, brainstorming, and a wide variety of hands-on student learning activities.

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 I	6	20%
2	exam II	12	20%
3	Quizzes and search reports	continues	20 %
4	Final exam	15	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)

- Office hours (6 hours per week + appointments)
- Help session (problem solving): On request (tutorials are added in the new course)

E. Learning Resources

1. List Required Textbooks

- Chemical Kinetics (3rd Edition.1987) , Keith J. Laidler
- Chemical kinetics (Arabic). (1st edition . 1995). Naser Al Andis.
- Chemical kinetics (Arabic). (1st edition. 1998). Suliman Alkhwaiter.

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

2. Essential References

Any reference dedicated to Kinetic Chemistry.

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

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

Websites that are related to kinetics



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.)

Lecture room with capacity of a minimum of 30 seats.

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

- Computer lab containing at least 30 computer sets.
- Chemistry Software as: <http://www.mchmultimedia.com/store/Kinetics>.
- Scientific calculator

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

Films about applications of catalysis in the main industries in Saudi Arabia.

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- Course evaluation by students
- student-faculty meetings
- direct contact between students and the department

2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor

- 1- Peer consultation on teaching
- 2- Department council discussion
- 3- Discussions within the group of faculty teaching the course

3 Processes for Improvement of Teaching

- 1- Conducting workshops given by experts on the teaching and learning methodologies
- 2- Periodical departmental revisions of the methods of teaching



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)

- 1- Providing samples of all kind of assessment in the departmental course portfolio of each course
- 2- Assigning group of faculty members teaching the same course to grade same question for various students
- 3- Conducting standard exams such as the American Chemical Society exams or others.

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

- 1- The course material and learning outcomes are periodically reviewed and the changes to be taken are approved in the departmental and higher councils
- 2- The head of department and faculty take the responsibility of implementing the proposed changes

Faculty or Teaching Staff : **Prof. Ahmed Aouissi / Dr. Abdelrazig Elfaki**

Signature:

Date Report Completed:

30/12/2015

Received by:

Dean/Department Head

Signature:

Date: 30/12/2015