



COURSE SPECIFICATION

Chemical Kinetics.

Chem. (332)

Revised April 2011

Course Specification

*For Guidance on the completion of this template, please refer to of Handbook 2
Internal Quality Assurance Arrangements*

Institution: King Saud University
College/Department : College of Sciences/Chemistry Department

A Course Identification and General Information

1. Course title and code: Chemical Kinetics (CHEM 332)
2. Credit hours: 3 (2 lectures + 0 lab+1 tutorial)
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. Nada Al- Jallal Dr Amel Moustafa, Dr. Naser Al andis, Dr. I. Aldrees
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) -----
8. Location if not on main campus

B Objectives

1. Summary of the main learning outcomes for students enrolled in the course. This course introduces fundamental principles of chemical kinetics and different ways to determine rate law of reaction and Arrhenius parameters and present briefly collision and transition state theories.
2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field) <ul style="list-style-type: none">• 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		
Topic	No of Weeks	Contact hours
Reaction rate and factors affecting the chemical rate.	2	6
Simple reactions	2	6
Experimental methods of measuring reaction rate.	2	6
Kinetics of complex reactions	3	9
Arrhenius equation.	1	3
Collisions theory	2	6
Transition state theory	2	6

2 Course components (total contact hours per semester):			
Lecture: 28	Tutorial: 14	Practical/Fieldwork/Internship: -	Other: -

<p>3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week)</p> <p>6 hours per week (homework, and other assignments)</p>

<p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> • A brief summary of the knowledge or skill the course is intended to develop; • A description of the teaching strategies to be used in the course to develop that knowledge or skill; • The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.
<p>a. Knowledge</p> <p>(i) Description of the knowledge to be acquired</p> <p>Upon successful completion of this course, the student shall be able to:</p> <ul style="list-style-type: none"> - List the factors that affect reaction rates - Use experimental data to determine the rate law expression and use these data to calculate rate constants, half-life and reaction order - Determine the order of chemical reactions by using half-life method. - Relate theoretical aspects of the course to the experimental results. - Identify applications of kinetics in industry and general life. - Master basic mathematical skills related to this course. - Apply different kinds of equations involved in this course to find kinetic parameters. - Identify suitable experimental methods for following a chemical reaction kinetically.

<p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> • 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.
<p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> • In-class quizzes, majors and final exams • Homework assignments
<p>b. Cognitive Skills</p>
<p>(i) Cognitive skills to be developed</p> <ul style="list-style-type: none"> • Stimulating thinking during lectures by giving some pop questions. • Showing the related slides obtained from the net • Homework assignments. • In-class short exams.
<p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> • Homework assignments on problem solving • In-class quizzes. • Med and final exams.
<p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> • Homework assignments • In-class quizzes • Major and final exams • Performance in discussions during lectures
<p>c. Interpersonal Skills and Responsibility</p>
<p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> • Students work effectively individually and in teams in classroom. • Involving students in group discussions

<ul style="list-style-type: none"> • Group and individual assignments
<p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <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 through written reports and oral presentations.
<p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> • Individual performance within a group • In-class problems solving. • Individual performance during lectures.
<p>d. Communication, Information Technology and Numerical Skills</p>
<p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> • Read, evaluate, and 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. • The ability to use computers for chemical simulation and computation, and database usage. • The ability to search and use the chemical literature in both printed and electronic formats.
<p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> • Homework assignments • In-class exams • Usage of computer and chemical software packages for kinetic chemistry applications

(iii) Methods of assessment of students numerical and communication skills <ul style="list-style-type: none"> • Performance in the problem solving assigned in the homework • Quizzes
e. Psychomotor Skills (if applicable)
(i) Description of the psychomotor skills to be developed and the level of performance required Not applicable
(ii) Teaching strategies to be used to develop these skills Not applicable
(iii) Methods of assessment of students psychomotor skills Not applicable

5. Schedule of Assessment Tasks for Students During the Semester			
Assessment	Assessment task (eg. essay, test, group project, examination etc.)	Week due	Proportion of Final Assessment
1	Class activities (in-class quizzes and discussions)	Weekly	5 %
2	Homework	3-6	5 %
3	Major Exam I	Week 6	20 %
4	Major Exam II	Week 12	20 %
5	Final Exam	Week 16	50 %

D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice.
(include amount of time faculty are 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. Required Text(s)

Add an English text book : توجد كتب أخرى على الموقع

<http://www.amazon.com/Chemical-Kinetics-3rd-Keith-Laidler/dp/0060438622>

- **Chemical Kinetics (3rd Edition.1987) , Keith J. Laidler**
- **Chemical kinetics (Arabic). 1st edition by Dr. Naser Al andis.**
- **Chemical kinetics (Arabic). 1st edition by Dr. Suliman alkhwaiter.**

2. Essential References

Any reference dedicated to Kinetic Chemistry.

3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)

4-Electronic Materials, Web Sites etc

Any web site dedicated to Kinetic Chemistry available on the internet

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

Power point presentations and other handouts posted on the WebCT for the students enrolled in the course.

F. Facilities Required

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

1. Accommodation (Lecture rooms, laboratories, etc.)

<ul style="list-style-type: none"> • A classroom with 30 seats
<p>2. Computing resources</p> <ul style="list-style-type: none"> • Computer lab containing at least 30 computer sets. • Chemistry Software as: http://www.mchmultimedia.com/store/Kinetics.html?NO_COOKIE_WARNING=2&ti=ffb78d22a2e0e690e98f7e720fb88ce6&xid=ac19563dac8822d7e5e908a39cda81e4 • Scientific calculator
<p>3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)</p>

G Course Evaluation and Improvement Processes

<p>1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching</p> <ul style="list-style-type: none"> • Course evaluation by students • Faculty – students general gathering
<p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none"> • Peer consultation on teaching • Departmental council discussions • Discussions with the group of faculty teaching both the lab and lecture portions of the course.
<p>3 Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> • Conducting workshops presented by experts on the teaching methodologies • Periodical departmental revisions on its methods of teaching • Monitoring of teaching activities by senior faculty members
<p>4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <ul style="list-style-type: none"> • Providing samples of all kind of assessment in the departmental course portfolio of the course • Assigning group of faculty members teaching the same course to grade same questions for various students. Faculty from other institutions are invited to review the accuracy of the grading policy

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

- **The course material and learning outcome are periodically reviewed and the changes to be taken are in the departmental and higher councils.**
- **The chairman of the department and faculty members take the responsibility**