

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



COURSE SPECIFICATION

(Organic Chemistry 3, 402367-3)

1435 / 1436 H

Course Specification

Institution: **Umm Al-Qura University.**

College/Department: **Faculty of Sciences - Chemistry Department.**

A. Course Identification and General Information

1. Course title and code: **Organic Chemistry 3, 402335-3**

2. Credit hours: **3 hours.**

3. Program(s) in which the course is offered: **Pure Chemistry**

4. Name of faculty member responsible for the course: **Dr. Essam M. Hussein**

5. Level/year at which this course is offered: **6th / third year**

6. Pre-requisites for this course (if any): **Organic Chemistry 2**

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:

- The students will gain knowledge about physical organic chemistry including the mechanism of chemical reactions. Also, the student will be able to understand the principles of the different reactions of carbanions and enolates compounds.
- 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):

- Using smart classes for teaching in lectures.
- The students will be encouraged to prepare an essay or a report from literature by using the library, data base services, and/or internet to follow up and update the new topics of physical organic chemistry and reaction mechanisms.

C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached):

Topics to be Covered			
Lecture	Topic	No of Weeks	Contact hours
1	▪ Thermodynamic parameters affecting the reactions.	1	2
2	▪ Reaction kinetics and determination of the reaction orders.	1	2
3	▪ Determination of reaction mechanism by physical and chemical methods.	1	2
4	▪ Nucleophilic substitution reactions S_N^1 and S_N^2	1	2
5	▪ Elimination reactions E1 and E2	1	2
6	▪ Electrophilic addition to carbon-carbon double bond	1	2
7	▪ Nucleophilic addition to carbonyl group and rearrangement	1	2
8	▪ Solvent effect on chemical reactions.	1	2
9	▪ The chemistry of the reactive intermediate such as carbanions, carbocation, carbenes and free radicals	1	2
10	▪ Reactions at the α -carbon via carbanions: generation of enolate anions, alkylation of enolate anions and enolate anions in carbonyl condensation reactions. In addition to properties and reactions of enols.	1	2
11	▪ Cycloaddition Reactions of Carbonyl Compounds	1	2
12	▪ Aldol and Claisen Condensations.	1	2

13	▪ Wittig reaction, Malonic ester and acetoacetic ester	1	2
14	α , β -unsaturated carbonyl compounds	1	2

2. Course components (total contact hours per semester):			
Lecture: 28	Tutorial: -	Practical/Fieldwork/Internship: 36	Other: -

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>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>1- Understanding the basic principles of organic reaction mechanisms.</p> <p>2- Understand of different types of organic reactions.</p> <p>3- Knowledge and understanding the factors affecting the electron availability.</p> <p>4- Understanding basic rules of reactivity and orientation in nucleophilic substitution reactions.</p> <p>5- Understanding the mechanisms of nucleophilic substitution and elimination reactions in different classes of substrates</p> <p>6- Understanding the factors affecting on substitution and elimination reactions.</p> <p>7- Memorize the importance of carbonyl compounds in organic synthesis.</p>

(ii) Teaching strategies to be used to develop that knowledge:

- Using open discussion to link the previous knowledge to the current and future topics.
- The students use the internet to prepare an essay about a recent advances related to the course physical organic chemistry.

(iii) Methods of assessment of knowledge acquired:

- Homework.
- Oral tests.
- Assignments.

b. Cognitive Skills:

(i) Cognitive skills to be developed

- To acquire skills to different types of organic reactions.
- To acquire skills to know thermodynamic parameters affecting the reaction.
- Developing skills of drawing and schematic the mechanism of different organic reactions.

(ii) Teaching strategies to be used to develop these cognitive skills:

- Using brain storming at the beginning of each lecture in order to stimulate the students towards the new topic of the course.
- Enhancing open discussion during the lecture.

(iii) Methods of assessment of students cognitive skills:

Assignments and homework.

c. Interpersonal Skills and Responsibility:

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed:

- Divide the student in to teams to perform some joint reports.
- The development of the student to accepts the opinion of his colleague in his participation to perform an active presentation for the topic related to the course, and evaluate the results to find out the

response of students for the collective cooperation.

(ii) Teaching strategies to be used to develop these skills and abilities:

- Encourage the solving problems in groups during lecture.
- Making open discussion about certain recent topic of the course.

(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility:

Homework and group reports

d. Communication, Information Technology and Numerical Skills:

(i) Description of the skills to be developed in this domain:

- Communicate effectively in oral and written forms.
- Using information and communication technologies.
- Using basic mathematical and statistical techniques.

(ii) Teaching strategies to be used to develop these skills:

- ❖ Using computer lab
- ❖ Visiting the Central Library
- ❖ Using international information network
- ❖ Visiting research centers

(iii) Methods of assessment of students numerical and communication skills:

- Ask questions in the tests to explanation for simple statistical information.
- Assessing the duties associated with suitable use of communication skills and numerical

e. Psychomotor Skills (if applicable):

(i) Description of the psychomotor skills to be developed and the level of performance required:

Non-requirement in the curriculum
(ii) Teaching strategies to be used to develop these skills: Non-requirement in the curriculum
(iii) Methods of assessment of students psychomotor skills: Non-requirement in the curriculum

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, Attendances and Duties	Throughout the Term	10%
2	Mid-Term Exam (s)	5-14	20%
3	Lab Activity and Final Exam on Lab	Throughout the Term	30%
4	Final Exam	End of the Term	40%
5	Total		100%

D. Student Support:

<p>1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week):</p> <ul style="list-style-type: none"> • We have faculty members to provide counseling and advice. • Office hours: During the working hours weekly. • Academic Advising for students.

E. Learning Resources:

1. Required Text(s): Physical Organic chemistry, Abdullaziz Kojh and Ahmed Shwali.

2. Essential References:

1. Organic chemistry, T.W. Graham Solomons and Craig Fryhle, 9th ed., Wiley, 2007.
2. Mechanisms of Organic Reactions, Howard Maskill, Oxford Chemistry Primers, 1996.
3. Structure and Reactivity in Organic Chemistry, Howard Maskill, , Oxford Chemistry Primers, 2000.
- 4- Organic Reaction Mechanisms, A. C. Knipe, Wiley-blackwell, 2006.
- 5- Structure and Reactivity in Organic Chemistry, [Mark G. Moloney](#), John Wiley & Sons Ltd, 2008

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

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4. Electronic Materials, Web Sites etc...:

- <http://www.chemweb.com>
- <http://www.sciencedirect.com>
- <http://www.rsc.org>

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

- Microsoft PowerPoint, Microsoft Word, Microsoft Excel.
- Videos on organic chemistry.

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.):

- Classrooms capacity (30) students.
- Providing hall of teaching aids including computers and projector.

1. Computing resources:

- Room equipped with computer and projector

3. Other resources (specify --eg. 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:

- Complete the questionnaire evaluation of the course in particular.

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

- ✓ Observations and the assistance of colleagues.
- ✓ Independent evaluation for extent to achieve students the standards.
- ✓ Independent advice of the duties and tasks.

3. Processes for Improvement of Teaching:

- Workshops for teaching methods.
- Continuous training of member staff.
- Review of strategies proposed.
- Providing new tools for learning.
- The application of e-learning.
- Exchange of experiences internal and external.

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):

- Check marking of a sample of exam papers, or student work.
- Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.

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

- ❖ Periodic Review of the contents of the syllabus and modify the negatives.
- ❖ Consult other staff of the course.
- ❖ Hosting a visiting staff to evaluate of the course.

❖ Workshops for teachers of the course.