

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



COURSE SPECIFICATION
(Organic Chemistry 4, 402437-3)

1435 / 1436 H

Course Specification

Institution: Umm Al-Qura University
College/Department: Faculty of Applied Sciences / Chemistry Department

A Course Identification and General Information

1. Course title and code: Organic Chemistry 4, 402437-3
2. Credit hours: 3 h
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Pure chemistry
4. Name of faculty member responsible for the course: Prof. Dr. Abdellatif Mohamed Salaheldin
5. Level/year at which this course is offered: 7th / fourth year
6. Pre-requisites for this course (if any): Organic Chemistry 3
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. By the end of this course, the student will understand the relationship between light absorption and structure. The student will be able to understand the basic principles of UV, IR and NMR spectroscopy and mass spectrometry, and to interpret these different types of Spectra to gain information about the structure of the organic compound.
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) Smart use of teaching halls for lectures

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

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
Principals of spectroscopy and index of hydrogen deficiency.	1	2
UV – Spectroscopy: ground and excited states, molar absorptivity, and calculation of λ_{\max} to the possible structure, applications and solving problems.	2	4
Infra-Red Spectroscopy (IR): general features of IR spectra, modes of vibrations, calculation of absorption frequency, factors affecting absorption frequency,	2	4
experimental aspects of IR spectroscopy, important IR chromospheres, interpretation of IR charts.	2	4
First regular exam	1	2
NMR Spectroscopy: the nature of NMR absorption instrumentation; chemical shifts in ^1H NMR spectroscopy; shielding and deshielding effect, magnetic anisotropy, spin–spin coupling in ^1H NMR spectroscopy; n+1 rule, solvent effect on the ^1H NMR spectroscopy, examples on the ^1H NMR spectroscopy	3	6
^{13}C NMR spectroscopy (chemical shift); more complex spin–spin splitting patterns.	2	4
Mass Spectrometry (MS): ionization process and instrumentation; examples of common types of fragmentation processes; applications and solving problems.	2	4
Second regular exam	1	2

2 Course components (total contact hours per semester):

Lecture: 28	Tutorial:	Laboratory: 42	Practical/Field work/Internship	Other:
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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)

Office hours: during the weekly working hours (**4 hours/week**).

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- 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.

a. Knowledge

(i) Description of the knowledge to be acquired

- Recognize the effect of light on the organic compounds
- Determine the Hydrogen deficiency of the unknown compound
- Identify an organic compound using spectroscopic analysis.
- Draw the structure of an organic unknown after interpretation of the spectral data.

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

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

(iii) Methods of assessment of knowledge acquired

Tests editorial periodic and final

Oral tests

Systematic research on the subject of the topics scheduled

b. Cognitive Skills

(i) Description of cognitive skills to be developed

The student acquires the skill to differentiate between different excitations in molecules

The student acquires the skill to know the distinction between the different spectra and how to interpret

Improve the advantage to discover the unknown organic compound from different spectra

(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.**
- Examples given in the lecture and exercises under the supervision of the lecture
- Give some practical issues and ask the students to find a strategy to resolve the Plan.
- Encourage learning transmission using analysis tools in different applications and through discussion of potential applications in other areas.

(iii) Methods of assessment of students cognitive skills

Through **assignments and homework**

Tests editorial periodic and final

Oral tests

c. Interpersonal Skills and Responsibility

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

- Students divide the collective teams to make some common reports

- **Take the personality and responsibility for their own learning**
- **Working effectively in groups and exercise leadership when appropriate**
- **Act ethically and consistently with high molar standards in personal and public fourms**
- **Community linked thinking**

(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

Evaluate the results and analysis of the issues and collective research and knowledge of the contribution of each individual through dialogue and discussion

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**
- **Use information and communication technologies**
- **Use basic mathematical and statistical techniques**

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

- Use the computer lab.
- Visit Central Library.
- Use of international information network.
- Visit research centers

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

Ask questions in the tests explanation of statistical information is simple.
Evaluation of the duties associated with the proper 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 Is not required in this course
(ii) Teaching strategies to be used to develop these skills Is not required in this course
(iii) Methods of assessment of students psychomotor skills Is not required in this course

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 teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)</p> <ul style="list-style-type: none"> - Availability of teaching staff to provide counseling and advice. - Office hours: during the weekly working hours, create the appropriate means (4 hours/week). - Academic guidance to students who need it, and taking into account the appropriate selection of members for that .
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E Learning Resources

<p>1. Required Text(s) Pavia, D. L.; Lampman, G. M.; Kriz, G. S. and Vyayan J. R., Itrroduction to Spectroscopy, Brook/cole Learning, 4th Edition (2009).</p>
<p>2. Essential References</p> <ol style="list-style-type: none">1. Organic Spectroscopy, Ayodhya Singh, Campus Books International, 2003.2. Spectroscopy, Keith Robinson, 1st ed., Springer, 2007.
<p>3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)</p> <p>Brown W. H.; Foot C. S.; Iverson B. L. and Anslyn E. V.; Organic chemistry Brook/cole Learning, 5th Edition (2009).</p>
<p>4- Electronic Materials, Web Sites etc</p> <ul style="list-style-type: none">➤ http://www.chemweb.com➤ http://www.sciencedirect.com <p>http://www.rsc.org</p>
<p>5- Other learning material such as computer-based programs/CD, professional standards/regulations</p> <ul style="list-style-type: none">▪ Microsoft PowerPoint, Microsoft Word, Microsoft Excel▪ Videos about organic chemistry (spectroscopy).▪ Learning tablets for organic chemistry (spectroscopy).

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.)
<p>1. Accommodation (Lecture rooms, laboratories, etc.)</p> <ul style="list-style-type: none"> • Classroom capacity (30) students. • Hall processing appropriate means, including educational and computers and Projector
<p>2. Computing resources</p> <p>Hall equipped with a computer , Projector and TV</p>
<p>3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)</p> <p>There are no other requirements</p>

G Course Evaluation and Improvement Processes

<p>1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching</p> <p>Complete the questionnaire due in particular calendar</p>
<p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none"> • Observations and assistance from colleagues. • Independent evaluation of the extent to which students' standards. • Independent advice of duties and tasks
<p>3 Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> • Workshops for teaching methods. • -Ongoing training of teaching staff. • Review the proposed strategies. • Provide the necessary modern tools for learning. • Application means of e-learning. • Exchange of internal and external expertise
<p>4. Processes for Verifying Standards of Student Achievement (eg. 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)</p> <ul style="list-style-type: none"> • Correction examination of a sample of the test papers, or student work, which was corrected by teaching staff member. • A professor scheduled exchange of a sample of assignments or tests corrected periodically with another member of the teaching staff of the same course in another educational institution
<p>5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p>

- Periodic review of course content and modify the negatives.
- Consulting other professors teaching the same course.
- Host a visiting professor to evaluate the course.
- Workshops for teaching staff members periodically