

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



COURSE SPECIFICATION

(Selected Topics in Organic Chemistry, 402457-2)

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: Selected Topics in Organic Chemistry, 402457-2
2. Credit hours: 2 hrs
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: Dr. Nizar El Guesmi
5. Level/year at which this course is offered: 8th / fourth year
6. Pre-requisites for this course (if any): Organic Chemistry 4
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 be able to understand the fundamental concepts of natural products, biomolecules and designing of organic syntheses.
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
Carbohydrates chemistry: classification, aldoses and ketoses, monosaccharides (reactions and synthesis)	2	4
disaccharides (structure, reactions) and polysaccharides	1	2
Nucleic acids: nucleosides, nucleotides, RNA and DNA	2	4
First regular exam	1	2
Amino acids and proteins: classification, optical properties, chemical properties, polypeptides and proteins structure.	2	4
Lipids: fatty acids, glycerides, classification of lipids, and chemical properties.	1	2
Terpenoids: introduction, general methods of determination of the structure, isolation and extraction. Classification: monoterpenoids, acyclic, monocyclic terpenoids, bicyclic monoterpenoids, sesquiterpenoids, triterpenoids and poly terpenoids.	2	4
Second regular exam	1	2
Steroids: introduction, their natural abundance, the difference between steroid compounds-nomenclature, structure elucidation of steroids and methods of preparation of steroids.	2	4
Alkaloids: introduction, general properties, extraction of alkaloids and structure elucidation of alkaloids. Different families of alkaloids: Phenylethylamine alkaloids, pyrrolidine alkaloids, pyridine or piperidine alkaloids, pyrrolidine-pyridine alkaloids, tobacco alkaloids, isoquinoline alkaloids and indole alkaloids.	2	4
Principles of designing syntheses for complex target molecules The disconnection approach, synthons, synthetic equivalents Selected examples using known reactions	1	2

2 Course components (total contact hours per semester):					34
Lecture:	Tutorial:	Laboratory	Practical/Field work/Internship	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)
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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

- Understand classification and optical properties of carbohydrates.
- Draw the structure of nucleic acids DNA and RNA.
- Recognize the chemical composition, optical properties and chemical properties of amino acids.
- Draw the structure of peptides and proteins.
- Distinguish lipids and know his functions in the body.
- Identify a natural compound using spectroscopic analysis.
- Know classification and chemical structures of Terpenoids and steroids.
- Know different families of alkaloids and his functions in the body
- Explain the disconnection approach for designing syntheses for complex target molecules

(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 chemistry, biochemistry and natural products.
- The students use the internet to prepare an essay about a recent advances related to the course of selected topics in organic chemistry.

(iii) Methods of assessment of knowledge acquired

<p>Tests editorial periodic and final</p> <p>Oral tests</p> <p>Systematic research on the subject of the topics scheduled</p>
<p>b. Cognitive Skills</p>
<p>(i) Description of cognitive skills to be developed</p> <p>The student acquires the skill to differentiate between different nucleic acid</p> <p>The student acquires the ability to recognize the general properties of natural products</p> <p>The student understands all steps which must be done during of designing syntheses for complex target molecules</p>
<p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> • 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. • Assigning student's duties that include open tasks designed for the application of prediction and analysis skills, problem solving. • Giving some applied examples and problem and ask the students to find a strategic plan to resolve them. • Encourage learning transmission using analysis tools in different applications and through discussion of potential applications in other areas
<p>(iii) Methods of assessment of students cognitive skills</p> <p>Through assignments and homework</p> <p>Tests editorial periodic and final</p> <p>Oral tests</p>
<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"> • Evaluate and develop the student's ability to work in a team. • The development of the ability of students to think and work in individual manner. • Working effectively in groups and exercise leadership when appropriate

<ul style="list-style-type: none"> • Act ethically and consistently with high moral standards in personal and public forums • Community linked thinking
<p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> • Divide the students into team works to evaluate their ability to work in groups and Making open discussion about certain recent topic of the course • Periodic duties that carried out in individual manner to evaluate the ability of students to take responsibility and self-reliance.
<p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <p>Evaluate the results and analysis of the issues and collective research and knowledge of the contribution of each individual through dialogue and discussion</p>
<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"> • Communicate effectively in oral and written forms • Use information and communication technologies • Use basic mathematical and statistical techniques
<p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> • The use of computers in the training room of the department. • Organization of group visits to the central Library. • The use of the international information network .
<p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> • Ask questions that measure the student's ability to interpret simple statistical information. • Evaluate the homework's and duties associated with the proper use of communication skills and numerical process.
<p>e. Psychomotor Skills (if applicable)</p>
<p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <p>It is not requirement for this course.</p>

(ii) Teaching strategies to be used to develop these skills It is not requirement for this course.
(iii) Methods of assessment of students psychomotor skills It is not requirement for 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	40%
3	Final Exam	End of the Term	50%
4	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.

E. Learning Resources

<p>1. Required Text(s)</p> <p>Chemistry of Natural Products, Sujata V. Bhat, Bhimsen A. Nagasampagi, Meenakshi Sivakumar, Springer, Berlin, 1st Edition (2005)</p>

<p>2. Essential References</p> <ol style="list-style-type: none"> 1. Natural products: Their chemistry and biological significance, J. Mann, Longman Scientific & Technical, 1994. 2. Lehninger Principles of Biochemistry, David L. Nelson and Michael M. Cox, 4th ed., W. H. Freeman, 2004. 37 3. Organic Synthesis: The Disconnection approach, Stuart Warren and Paul Wyatt, 2nd ed., Wiley, 2008.
<p>3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)</p> <p>The Organic Chemistry of Biological Pathways, John McMurry, Tadhg Begley, Roberts & Company Publishers, 1st Edition (2005)</p>
<p>4- Electronic Materials, Web Sites etc</p> <ul style="list-style-type: none"> • http://www.chemweb.com • http://www.sciencedirect.com • http://www.rsc.org
<p>5- Other learning material such as computer-based programs/CD, professional standards/regulations</p> <ul style="list-style-type: none"> ▪ Microsoft Power Point, Microsoft Word, Microsoft Excel ▪ Videos about natural product. ▪ Learning tablets for biochemistry.

F. Facilities Required

<p>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>
<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>

Hall equipped with a computer , Projector and TV
3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)
There are no other requirements

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching
The educational process is evaluated using questionnaire forms or panel discussions with students in order to identify and address weakness and strength points.
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department
<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
3 Processes for Improvement of Teaching
<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
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)
<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
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.
<ul style="list-style-type: none"> • 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

