Kingdom of Saudi Arabia

The National Commission for

Academic Accreditation & Assessment

Course Specifications

Physical Organic and Stereochemistry

(402235-3)

(First Term 1436-1437)

Course Specifications

Institution: **Umm Al-Qura University**	Date of Report: **2016**
College/Department: **Faculty of Applied Science/ Department of Chemistry**	

A. Course Identification and General Information

1. Course title and code: **Physical Organic and Stereochemistry (402235-3)**			
2. Credit hours**: 3(3+0)**			
3. Program(s) in which the course is offered. **Chemistry program**			
4. Name of faculty member responsible for the course: **Prof. Dr. Thoraya A. Farghaly**			
5. Level/year at which this course is offered**: 4th level/2 year (1st term)**			
6. Pre-requisites for this course (if any) **Chemistry of aromatic compounds (402234-3)**			
7. Co-requisites for this course (if any): Nothing			
8. Location if not on main campus: In main campus			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom	☐	What percentage?	
b. Blended (traditional and online)	■	What percentage?	100%
c. e-learning	☐	What percentage?	
d. Correspondence	☐	What percentage?	
f. Other	☐	What percentage?	
Comments:			

B Objectives

1. What is the main purpose for this course? **By the end of this course student will be familiar with Studying the organic mechanisms and types of electronic effects of groups in molecules and studying the replacement, additions and elimination reactions. Stereochemistry and conformational isomerism.·**
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) **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
1. General Introduction - Knowledge of the basic rules in organic chemistry including: Electronegativity - Covalent bonds - Hydrogen bonds - Energy bonds - Dipole Moment.	2	6
2. Types of electronic effects of groups in molecules: Inductive Effect- Mesomeric Effect.	1	3
3. Complement of the effects of electronic for groups: Electromeric Effect - Steric Effect – Hyper Conjugation – Inductomeric Effect.	1	3
4. Definition of organic reactions – Aliphatic Nucleophilic Substitution Reactions - S_N1 and S_N2 Mechanisms.	1	3
5. Factors affecting on S_N1 and S_N2 Mechanisms.	1	3
6. Aromatic Nucleophilic Substitution Reactions and mechanisms. Aromatic Electrophilic Substitution Reactions and mechanisms.	1	3
7. Elimination reactions and mechanisms.	1	3
8. Introduction to stereochemistry - Isomerism - Configuration - shape and types of isomerism: structural and conformational.	1	3
9. Complement of conformational isomerism (Geometric – Shape for cyclic and open compounds)	1	3

10. Complement of Molecular Chirality - Optical isomerism - Enantiomers and their Optical activity -Fischer projection- Absolute configuration.	1	3
11. Compounds that contain more than one chiral carbon atom - Diastercomers and their properties.	1	3

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	36	4	0	0	0	40
Credit	3	0	0	0	0	3

3. Additional private study/learning hours expected for students per week. 10

- Assignments 4 Hrs
- Tutorials 4 Hrs
- e-learning 2 Hrs

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

- Brief summary of the knowledge or skill 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.

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Memorize of the basic rules in organic chemistry.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios • long and short essays posters lab manuals
1.2	Understand of the division of types of electronic effects of groups in molecules.		
1.3	Knowledge and understanding of the mechanism of different types of organic reactions.		
1.4	Understand S_N^1 and S_N^2 Mechanisms.		
1.5	Knowledge of types of isomerism.		
1.6	Draw a shape of open and cyclic compounds.		
1.7	Understand of the absolute configuration.		
1.8	Knowledge of Diastercomers and their properties and Molecular Chirality.		

2.0	**Cognitive Skills**		
2.1	The ability to use the Internet for more information specially you tube	• Lectures • Scientific discussion • Library visits • Web-based study	• -Discussing and evaluating the topics that students learn from their textbooks and other sources. • Assignments, Midterm Exams and Final examination at the end of semester. • Solving problems related to course. • Individual assignments or oral exam for developing/solving a task
2.2	Attention, Memory, Self-regulation, and Motor executive functions		
2.3	The studen't acquiring of the skill of how to predict the mechanism of the different reactions		
2.4	The students use the internet to prepare an essay about a recent advances related to the course of physical organic chemistry and stereochemistry.		
2.5	Developing skills of drawing shape of the stereochemistry of organic compounds.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	The division of students collectively for teams to make some common reports	• Lectures • Scientific discussion Web-based study	• Exams web-based student performance systems
3.2	Self-reliance and take individual responsibility and the ability to work within the group		
3.3	Encouraging students to use online resources.		
4.0	**Communication, Information Technology, Numerical**		
4.1	The ability to conduct a successful style of dealing with data analysis, describing his strategy in the image and draw conclusions from them	• Lectures • Scientific discussion • Library visits Web-based study	• web-based student performance systems individual and group presentations
4.2	Introductory lecture at the beginning of the semester to use the computer and the internet to search for sources of new researches and collect the researches which help in writing reports on topics related to syllabus.		
4.3	Evaluating the performance of the students through examination, duties and the discussion in the lecture which constitute 30 % of the total evaluation.		
5.0	**Psychomotor**		
5.1	NOT APPLICABLE		

5.2	

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	Assignments, activities, HW		10%
2	Two periodically exams	5-14	40%
3	Final Exam	16	50%
4	Total		100%

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)

- **We have faculty members to provide counseling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic Advising for students.**

E. Learning Resources

1. **List Required Textbooks**

- John McMurry's "*Organic Chemistry, 8th edition, International Edition*" 2011, Brooks/Cole.
- T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder "*Organic Chemistry, 11th Edition, International Student Version*" 2013, John Wiley & Sons.

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

- Lecture Hand outs available on the coordinator website

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

- Amit Arora "*Introductory Organic Chemistry*" 2006, Discovery Publishing House New Delhi.
- Michael J. T. Robinson "*Organic Stereochemistry*" 2000, OUP Oxford.
- R. K. Sharma "*Stereochemistry, Volume 4*" 2008, Discovery Publishing House.

• Howard Maskill "*Structure and Reactivity in Organic Chemistry*, Volume 81 of Oxford Chemistry Primers" 1999, OUP Oxford.
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, 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 or regulations and software.

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

2. Computing resources (AV, data show, Smart Board, software, etc.) ▪ **Room equipped with computer and projector and TV.**
3. Other resources (specify, e.g. 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
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • **Observations and the assistance of colleagues.** • **Independent evaluation for extent to achieve students the standards.** • **Iindependent 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.**
- **Eexchange of experiences internal and external.**

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)

- **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.**

Faculty or Teaching Staff: Professor Dr. Thoraya A. Farghaly

Signature: ___*Thoraya A. Farghaly*____ **Date Report Completed: 21-4-2016**

Received by: _____ Dean/Department Head

Signature: _____ Date: _____