

**Kingdom of Saudi Arabia**

**The National Commission for**

**Academic Accreditation & Assessment**



**Course Specifications**

**Organic Reactions and Preparations**

**402336-3**

### Course Specifications

Institution: <b>Umm Al-qura University</b>	Date of Report: <b>2015</b>
College/Department : <b>Faculty of Applied Science/ department of chemistry</b>	

#### A. Course Identification and General Information

1. Course title and code: <b>Organic Reactions and Preparations / 402336-3</b>			
2. Credit hours: <b>3 (2+1)</b>			
3. Program(s) in which the course is offered. <b>Chemistry program</b>			
4. Name of faculty member responsible for the course: <b>Dr. Essam M. Hussein</b>			
5. Level/year at which this course is offered: <b>6<sup>st</sup> level / 3<sup>rd</sup> year</b>			
6. Pre-requisites for this course (if any): -			
7. Co-requisites for this course (if any)---			
8. Location if not on main campus: <b>both on El-Abedyah, El-Azizya, and El-Zaher</b>			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
b. Blended (traditional and online)	<input checked="" type="checkbox"/>	What percentage?	<b>100%</b>
c. e-learning	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
d. Correspondence	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
f. Other	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
Comments:			

2

0

1

6

## B Objectives

1. What is the main purpose for this course?

**By the end of this course student will be familiar with theoretical and practical study of the different reactions to synthesis of different classes of organic compounds**

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
a. Chemistry of functional groups	2	4
b. Named reactions: Bucherer reaction- Cannizzaro reaction - Chichibabin reaction - Chugaev elimination - Clemmensen reaction – Claisen condensation – Claisen rearrangement - Cope elimination	1	2
c. Cope rearrangement - Curtius rearrangement – Dieckmann condensation - Doebner reaction - Edman degradation - Eschweiler–Clarke reaction - Friedel–Crafts acylation	1	2
d. Fischer reaction - Friedländer synthesis - Skraup reaction - Skraup reaction - Fries rearrangement - Gabriel synthesis - Gattermann reaction - Gattermann Koch reaction - Gomberg–Bachmann reaction	1	2
e. Grignard reaction – Hantzsch reaction - Kiliani–Fischer synthesis - Knoevenagel condensation - Leuckart reaction – Michael reaction - Perkin reaction - Reformatskii reaction - Reimer–Tiemann reaction	2	4
f. Robinson reaction - Robinson annulation - Ruff degradation - Sandmeyer reaction - Schmidt reaction - Schotten–Baumann reaction - Stephen aldehyde synthesis	1	2
g. Wittig reaction - Ullmann reaction - Kolbe–Schmitt reaction - Strecker amino acid synthesis – Williamson reaction	1	2
h. Redox reactions: Aldehydes – Ketones – Carboxylic acids – esters – Aromatic hydrocarbons	1	2
i. Introduction to Organic Synthesis	2	4
j. Retrosynthetic approach	2	4

**Practical Part:**

- I- Purification of organic compounds
- II- Synthesis of benzoin
- III- Synthesis of benzil
- IV- Synthesis of Benzilic acid
- V- Synthesis of Diazoamino Benzene
- VI- Synthesis of Acetyl salicylic acid (Aspirin)
- VII- Synthesis of Acetanilide

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

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	28	-		39		67
Credit	3	-		1		4

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

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

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	Know the different methods used in the preparation of various organic compounds	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Scientific discussion</li> <li>• Library visits</li> <li>• Web-based study</li> </ul>	<ul style="list-style-type: none"> <li>• Exams</li> <li>• web-based student performance systems</li> <li>• portfolios</li> <li>• long and short essays</li> <li>• posters lab manuals</li> </ul>
1.2	Recognize the different methods used in the preparation of various organic compounds		
1.3	Identify the different classes of organic compounds depending on the functional groups		
1.4	Write the products of chemical reaction correctly		
1.5	Determine the type of mechanism and intermediates in different organic reactions		
1.6	Identify different synthetic pathways		
1.7	Familiar with different techniques of purification of organic compounds		
1.8			
1.9			
1.10			
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Explain the outputs of organic chemical reactions	• Lectures	• Exams

2.2	Compare between different methods to synthesis different organic compounds	<ul style="list-style-type: none"><li>• Scientific discussion</li><li>• Library visits</li><li>• Web-based study</li></ul>	<ul style="list-style-type: none"><li>• web-based student performance systems</li><li>• portfolios</li><li>• posters</li><li>• demonstrations</li></ul>
2.3	Explain the reaction mechanisms for different organic reactions		
2.4	Predict the products of different organic reactions		
2.5	Summarize the different methods of organic synthesis		
2.6	Apply the different laboratory techniques to purify the organic molecules		
2.7			
3.0	Interpersonal Skills & Responsibility		
3.1	Use the retrosynthetic approach to synthesis of different organic molecules	<ul style="list-style-type: none"><li>• Lectures</li><li>• Scientific discussion</li><li>• Web-based study</li></ul>	<ul style="list-style-type: none"><li>• Exams</li><li>• web-based student performance systems</li></ul>
3.2	Choose the suitable mechanism for a given reaction		
4.0	Communication, Information Technology, Numerical		
4.1	Evaluate the different methods of preparation of organic compounds	<ul style="list-style-type: none"><li>• Lectures</li><li>• Scientific discussion</li><li>• Library visits</li><li>• Web-based study</li></ul>	<ul style="list-style-type: none"><li>• web-based student performance systems</li><li>• individual and group presentations</li></ul>
4.2	Demonstrate a synthetic pathways for synthesis of organic compounds		
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	Exam	5-14	20%
2	Assignments		10
3	Practical Exam	15	30%
4	Final Exam	16	40%

#### 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

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

#### 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)

1. Stuart Warren, Paul Wyatt "*Organic Synthesis: The Disconnection Approach, 2<sup>nd</sup> Edition*" 2008, Wiley-Blackwell.
- M. Casey, J. Leonard, B. Lygo, G. Procter "*Advanced Practical Organic Chemistry*" 1990, Springer US

#### 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

Complete the questionnaire evaluation of the course in particular.

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.**
- **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 (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: Dr. Essam M. Hussein

Signature: 

Date Report Completed: 2015

Received by: Dr Hatem Altass Department Head

Signature: \_\_\_\_\_ Date: \_\_\_\_\_