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Arab International University

Faculty: Pharmacy; Department: pharmaceutical chemistry & drug control

Course No: 023210B **Course Name:** Organic Chemistry II

Course Description

Credit hours:4hours (weekly). Theoretical: 3 hours. Practical:2 hours.
Prerequisite: Organic Chemistry I

Course Objectives

1- To provide the important and essential principles in organic chemistry for study medicine.
2- To provide understanding of the physical and chemical properties of organic compounds and show its importance as compounds important in living systems and drug syntheses.
3- To provide understanding the scientific principles in organic chemistry and their links to drug synthesis and pharmaceutical chemistry.
4- Identification of the functional groups in organic compound and preparation of some characteristic derivatives.
5- Separation of mixtures of organic compounds or pharmaceuticals by chemical extraction.
6- Application of some organic reactions used in the synthesis, separation and purification of organic compounds and pharmaceuticals

Activities description by ABC LD

- **Acquisition activities (AA):** Learning through acquisition is what learners are doing when they are listening to a lecture or podcast, reading from books or websites, and watching demos or videos.
- **Collaboration activities (CA):** Learning through collaboration embraces mainly discussion, practice, and production. Building on investigations and acquisition it is about taking part in the process of knowledge building itself.
- **Discussion activities (DA):** Learning through discussion requires the learner to articulate their ideas and questions, and to challenge and respond to the ideas and questions from the teacher, and/or from their peers.
- **Investigation activities (IA):** Learning through investigation guides the learner to explore, compare and critique the texts, documents and resources that reflect the concepts and ideas being taught.
- **Practice activities (PraA):** Learning through practice enables the learner to adapt their actions to the task goal, and use the feedback to improve their next action. Feedback may come from self- reflection, from peers, from the teacher, or from the activity itself, if it shows them how to improve the result of their action in relation to the goal.
- **Production activities (ProA):** Learning through production is the way the teacher motivates the learner to consolidate what they have learned by articulating their current conceptual understanding and how they used it in practice.

Theoreticalhours outline

Week	Topic (LN, Lecturer notes; PCSA, Pre-class student activity; DCSA, During class student activity, HW, Homework)	Textbook Chaptersand Pages *T:C,p-p
1	**Organohalides.** LN: reading organohalids. pdf(p287-305) (AA, 2 hours) PCSA: search on internet about organohalids and their relation with drug structure. (IA, 2 hours) DCSA: discussing the internet research done by students and compared with lecturer notes. (DA, 1.5 hours) HW: ask students to form groups of4 students to prepare3 minutes' video about organohalids reaction and its important in drug synthesis, pharmaceutical chemistry and living systems. (ProA, 2 hours; CA, 2 hours)	1:10,287-308
2	**Reactions of alkyl halides** LN: reading Reactions of alkyl halides.pdf (p309-340) (AA, 2 hours) PCSA: search on internet about Reactions of alkyl halides, nucleophile substitution reaction" SN2 & SN1" and elimination reaction: E1 & E2". (IA, 2 hours) DCSA: discussing the internet research done by students and compared with lecturer notes. (DA, 1.5 hour) HW: ask students to form groups of 4 students to discuss the mechanism of some reactions using discussion forums in moodle. (DA, 2 hours)	1:11,309-340
3	**Benzene and aromaticity.** LN: reading Benzene and aromaticity.pdf (p12) (AA, 2.5 hours) PCSA: search on internet about chemistry of benzene, aromatic compound, and aromaticity (AA, 2.5 hours) DCSA: discussing the internet research done by students and compared with lecturer notes. (DA, 2 hours). HW: ask students to form groups of 4 students and prepare a presentation aroud aromatic compound and its importance in medicinal compound. Students`s group have to present this project before the course ending. (ProA, 1 hour; CA, 2 hours)	1:15,451-485
4&5	**Chemistry of benzene.** LN: reading **Chemistry of benzene**.pdf (p487-523) (AA, 4 hours). PCSA: reading on internet around electrophile substation a benzene and alkyl benzene (AA, 3 hours), watching some video around **reactivity and orientation that effect on the reactions of benzene (**AA, 1 hour) DCSA: Discussing the PCSA and compared with LN. (DA, 1.5 hour), HW: Ask students to form groups of 4 students to discuss the mechanism of some electrophile substations reactions in benzene using discussion forums in moodle. (DA, 2 hours)	1:16,487-523

Week	Topic (LN, Lecturer notes; PCSA, Pre-class student activity; DCSA, During class student activity, HW, Homework)	Textbook Chaptersand Pages *T:C,p-p
6	**Alcohols and phenols.** LN: Reading **Alcohols and phenols**.pdf (p525-565) (AA, 3 hours) PCSA: Search on internet about the reactions of alcohols and phenols and their important in pharmaceutical chemistry (AA, 2 hours). DCSA: discussing the PCSA and compared with LN. (DA, 2 hours). HW: ask students to form groups of 4 students and prepare 5 minutes' video on the reactions of alcohols and phenols and its important in pharmaceutical chemistry and in pharmacy in general. (ProA, 2 hours; CA, 2 hours)	1:17,525-565
7	**Ethes, Epoxydes, Thiols , and Sulfides.** LN: reading Ethes, Epoxydes, Thiols , and Sulfides.pdf (p**594-568**) (AA, 2 hours) PCSA: reading on internet around reactions of Ethes, Epoxydes, Thiols, and Sulfides and focusing in thier role in biochemistry (AA, 2 hours) DCSA: discussing the PCSA and compared with LN. (DA, 2 hours) HW: ask students to form groups of 4 students and prepare a presentation about the important of these functional group in pharmaceutical applications or in biological reactions. (ProA, 2 hours; CA, 2 hours)	1:18,**594-568**
8+9	**Aldehydes and Ketones.** LN: reading Aldehydes and Ketones. pdf (p**646-604**) (AA, 4 hours) PCSA: reading and watching some videos on internet about aldehydes and ketons reactions in its role in efficient synthesis of pharmaceutical intermediates aldehydes and ketones (AA, 4 hours) DCSA: discussing the PCSA and compared with LN. (DA, 2 hours) HW: ask students to form groups of 4 students and prepare a project titled: efficient synthesis of pharmaceutical intermediates from Biomass-Derived Aldehydes and Ketones. The group of students must present this project before the course ending. (ProA, 3 hours; CA, 2 hours)	1:19,**646-604**
10	**Carboxylic acids and Nitriles.** LN: reading Carboxylic acids and Nitriles.pdf (p**677-653**) (AA, 1.5 hour) PCSA: search on internet about Carboxylic acids and Nitriles and their reactions. (IA, 2 hours) DCSA: discussing the PCSA and compared with LN. (DA, 1.5 hour) HW: ask students to form groups of 4 students and watching videos about carboxylic acid and their reactions in peptide synthesis and prepare summary report (ProA, 1 hours, CA, 2 hours).	1:20,**677-653**
11	**Carboxylic acid derivatives** LN: reading Carboxylic acid derivatives.pdf (p**726-679**) (AA, 1 hour) PCSA: search on internet about reactions of carboxylic acid aerviatives and its role in polymer synthesis (AA, 1 hour). DCSA: discussing the PCSA and compared with LN. (DA, 1.5 hour).	1:21,**726-679**

Week	Topic (LN, Lecturer notes; PCSA, Pre-class student activity; DCSA, During class student activity, HW, Homework)	Textbook Chaptersand Pages *T:C,p-p
12	**α- Carbonyl substitution reactions** LN: reading α- Carbonyl substitution reactions .pdf (p 727-752) (AA, 2 hours) PCSA: search on internet about (α- Carbonyl substitution reactions) (IA, 1.5 hours) DCSA: discussing the PCSA and compared with LN. (DA, 1.5 hour)	1:22,**752-727**
13	**Carbonyl Condensation Reactions** LN: reading Carbonyl Condensation Reactions.pdf (p 753-783) (AA, 2 hours) PCSA: search on internet about (Carbonyl Condensation Reactions) (IA, 1.5 hours) DCSA: discussing the PCSA and compared with LN. (DA, 1.5 hour)	1:23,**783-753**
14& 15	**Amines and Heterocycles** LN: reading Amines and Heterocycles .pdf (p 787-830) (AA, 3 hours) PCSA: search on internet about reactions of amines and hetrocycles amine and its role in biochemistry, pharmaceuticals chemistry and drug synthesis (IA, 3 hours) DCSA: discussing the PCSA and compared with LN. (DA, 1.5 hour) HW: ask students to form groups of 4 students and watching videos about amines and their reactions in peptide synthesis and prepare summary report (ProA, 1 hours, CA, 2 hours). **The student are invited to play the educational game installed in moodle to prepare to Final Exam**	1:24,**830-787**

*****T is the reference number as cited under the book information paragraph, C is the chapter's number and p-p are page numbers.
AA, Acquisition activities; CA, Collaboration activities; DA, Discussion activities; IA, Investigation activities; PraA, Practice activities; ProA, Production activities.

Practical hours outline: All these hours are considered as practical activities (lab work). Hence, total PA is 28 hours

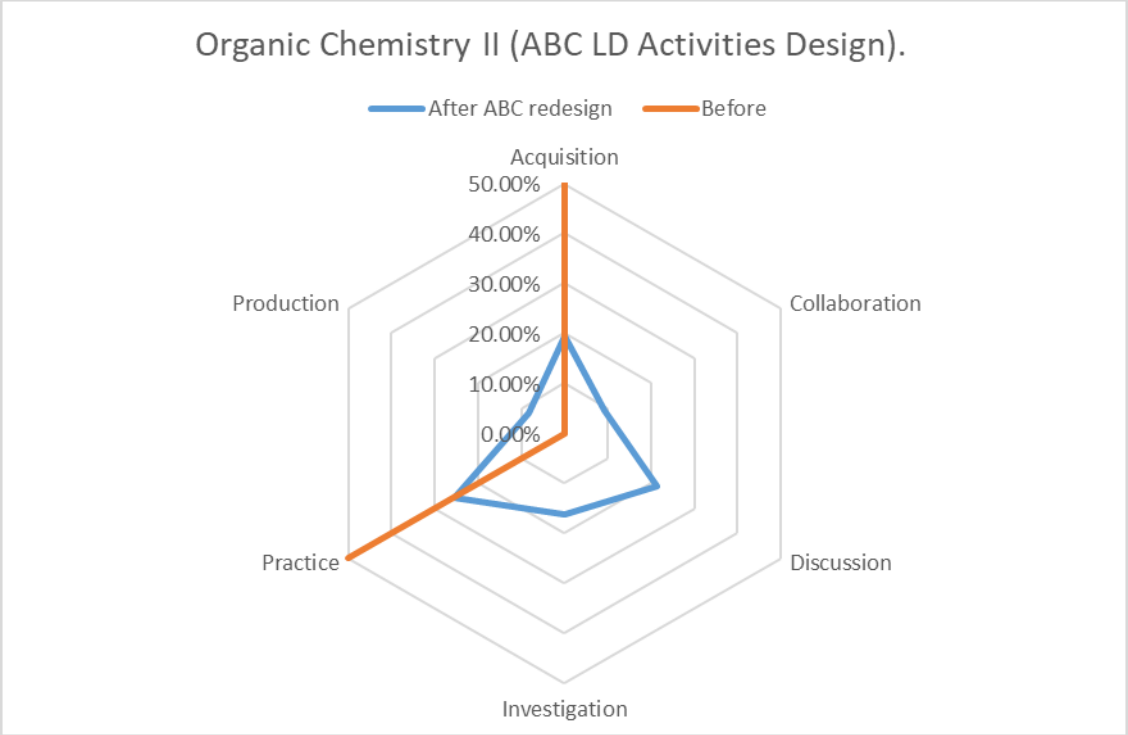
Week	Topic	Textbook Chapters and Pages. *T:C,p-p
1	General instructions and safety rules, hazards in organic chemistry.	2,1&2,2-9
2	Laboratory accidents, common organic laboratory apparatus experiments.	2, 3&4,10-16
3	Separation of a mixture of benzoic acid & acetanilide.	2,5,18-20
4	Synthesis of nitrobenzene.	2,6, 21-23
5	Synthesis of ρ-nitroacetanilide.	2,7,24-26
6	Synthesis of aspirin.	2,8,27-29

Week	Topic	Textbook Chapters and Pages. *T:C,p-p
7	Reaction of esterification, synthesis of butyl acetate.	2,9,30-33
8	Separation of a mixture of water insoluble compounds by chemical extraction.	2, 10,34-40
9	Reactions aldehydes and ketones, characterization and identification tests.	2, 11, 41-47
10	Reaction of aldehydes and ketones, preparation of derivatives.	2,12,48-52
11	Synthesis of iodoform (Haloform reaction).	2, 13, 53-56
12	Reactions of amines, characterization and identification tests.	2,14,57-63
13	Reactions of carboxylic acids and phenols, characterization and identification tests.	2,15,64-67
14	Hydrolysis of acetanilide, identification tests for carboxylic acids and amines.	2,16,68-71
15	Exam	

*T is the reference number as cited under the textbook information paragraph, C is the chapter's number and p-p are page numbers.

Activities distribution after redesigning using by ABC LD

Organic Chemistry II (ABC LD Activities Design).		
	After ABC redesign	**Before**
Acquisition	19.5%	50%
Collaboration	9.2%	0
Discussion	21.3%	0
Investigation	16.1%	0
Practice	25.6%	50%
Production	8.3%	0
Total	**100%**	**100%**



book Information:

1-John McMurry ORGANIC CHEMISTRY Eighth Edition, (2012), THOMSON, BROOKS/ COLE.

2-Manual of pharmaceutical organic chemistry I, by Prof. Dr. Al-Khayat M. Ammar, B.Sc. Iman Khabbaz, 2009-2010, AIU, Syria.

Course coordinator:

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