هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA T4 2020

Course Specifications

Course Title:	Pharmaceutical Organic Chemistry
Course Code:	PHRM 212
Program:	Pharm D
Department:	Pharmaceutical Chemistry
College:	Pharmacy College
Institution:	King Saud University

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A. Course Identification

1. Credit hours: **3(2+1)**
2. Course type **a.** University ☐ College ■ Department ☐ Others ☐ **b.** Required ■ Elective ☐
3. Level/year at which this course is offered: **2nd Year, 5th Level**
4. Pre-requisites for this course (if any)**:** **CHEM 109**
5. Co-requisites for this course (if any)**:**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	16	% 32
2	**Blended**	4	% 8
3	**E-learning**		
4	**Distance learning**		
5	**Other (Lab.)**	10 (Actual = 30)	% 60

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20
2	**Laboratory/Studio**	30
3	**Tutorial**	
4	**Others** (specify)	
	Total	50

B. Course Objectives and Learning Outcomes

1. Course Description

The course covers an in-depth knowledge of organic chemistry with particular emphasis on the synthesis, reactions, mechanism of reactions and stereochemistry of organic molecules. The chemistry of heterocyclic compounds shall be detailed. The importance of different organic classes in nature and in pharmaceutical and chemical industries will be outlined. The laboratory period deals with the identification of different classes of organic compounds using spectroscopic techniques and based on differences in their physicochemical properties.

2. Course Main Objective

To introduce students to three-dimensional structure, reactivity and reactions of pharmacologically important chemical classes, which is the base knowledge to medicinal chemistry.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Recognize the basic principles of organic chemistry with particular emphasis on the synthesis, reactions, mechanism of reactions and stereochemistry of organic molecules.	1.1.1
1.2	Acquire some knowledge about the metabolism of some important drugs. Besides, describing the basic principles of heterocyclic compounds.	1.1.2
1.3	Solve the Problem dealing with nomenclature of organic compounds, synthesis and metabolism.	1.1.3
1.4	Differentiate between the different classes of organic compounds based on the important function groups.	1.1.1
2	**Skills :**	
2.1	Handle different chemicals and laboratory glassware properly and safely	2.3.1 2.7.
2.2	Operate scientific experiments based on stepwise procedure to predict chemical practical experiment, observation of reaction.	2.7.3
2.3	Draw the chemical structure of pharmaceutical compounds using suitable ChemDraw program.	2.6.2
2.4	Analyze the spectroscopic information (spectra) of organic compounds that confirm their chemical structures.	2.6.3
3	**Values:**	
3.1	Behave in ways that convey a professional image such as adherence to deadlines, punctuality, compliance to class rules and regulations.	3.4.1
3.2	Increase awareness in how to communicate with instructors and university staff. Besides, utilize appropriate databases for literature search.	3.2.1 3.2.2
3…		

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Organic Chemistry	1
2	Substitution Reactions	2
3	Addition Reactions	1
4	Elimination Reactions	1
5	Rearrangement Reactions	1
6	Functional Groups	2
7	Stereochemistry (Structural Isomers)	1
8	Geometrical Isomers	1
9	Optical Isomers	2
10	Sugar Chemistry	1
11	Heterocyclic Chemistry (Introduction)	1
12	Nomenclature	2
13	Pyrrole and five-membered heterocycles	2

14	Pyridine and six-membered heterocycles	1
15	Miscellaneous fused rings heterocycles	1
Total		**20**

Lab content		
No	**List of Topics**	**Contact Hours**
1	Introduction, Drawing chemical structures using computers	3
2	Principle of IR, MS, and NMR	3
3	Revision	3
4	Identification of alcohols & Phenols	3
5	Identification of carboxylic acids	3
6	Identification of carboxylic acids	3
7	Revision	3
8	Identification of aldehydes and ketones	3
9	Identification of amines and amides	3
10	Identification of esters	3
Total		**30**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	Recognize the basic principles of organic chemistry with particular emphasis on the synthesis, reactions, mechanism of reactions and stereochemistry of organic molecules.	1- Lectures. 2- Independent study from textbooks. Introductory lecture gives an overview of the content and significance of the course and of its relationship to students' existing knowledge. Each subsequent lecture begins with a similar overview linking the particular content of the presentation to the general overview.	1- MCQ questions 2- SAQ questions. 3- Oral questions.
1.2	Acquire some knowledge about the metabolism of some important drugs. Besides, describing the basic principles of heterocyclic compounds.		
1.3	Solve the Problem dealing with nomenclature of organic compounds, synthesis and metabolism.		
1.4	Differentiate between the different classes of organic compounds based on the important function groups.		
2.0	**Skills**		
2.1	Handle different chemicals and laboratory glassware properly and safely.	1- Explanations and examples given in lectures 2- Assignment tasks include some	1- Problem solving questions. 2- Direct discussion about the topic

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.2	Operate scientific experiments based on stepwise procedure to predict chemical practical experiment, observation of reaction.	open ended tasks designed to apply predictive, analytical and problem solving skills. 3- Class discussions. Case studies related to the course topics.	during the lecture (question &answer) 3- Assessment during the class from the student feedback (level of understanding) 4- Raising oral questions during class discussion. 5- Group and individual assignments require application of analytical tools in problem solving tasks.
2.3	Draw the chemical structure of pharmaceutical compounds using suitable ChemDraw program.		
2.4	Analyze the spectroscopic information (spectra) of organic compounds that confirm their chemical structures.		
3.0	**Values**		
3.1	Behave in ways that convey a professional image such as adherence to deadlines, punctuality, compliance to class rules and regulations.	Training on different types of assignments where a specified time limit is given to the students.	Oral Questions
3.2	Increase awareness in how to communicate with instructors and university staff. Besides, utilize appropriate databases for literature search.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
2	Mid-term	6	25%
	Laboratory work	Every lab.	10%
4	Laboratory Exam	10	15%
	Student's Portfolio	8	10%
5	Final Exam		40%
6			
7	Total		100%

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

The course instructors are available upon appointment and should respond within 48 hours after the first contact.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	R. Fessenden and J. Fessenden, Organic Chemistry, PWS Publishers, 6th Edition
Essential References Materials	J.A. Joule and G.F. Smith, Heterocyclic chemistry, 2000, Van Nost Reinhold
Electronic Materials	SDL, LMS
Other Learning Materials	Computer-based programs as Marvin Skitch

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms, laboratories
Technology Resources (AV, data show, Smart Board, software, etc.)	data show, Smart Board, software (Chem4Draw)
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	▪ Labs with Hoods and benches ▪ Chemicals ▪ Glass wares as test tubes, beakers, pipettes, glass bottles , ▪ Hotplates, IR spectrophotometer, GC-Mass spectrometer, NMR- spectrophotometer Chem4Draw software and computers

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	Students survey
Extent of achievement of course learning outcomes	Instructor	Direct (Exams) Direct (lab reports)
Effectiveness of teaching	Peer reviewer	Direct consultation
Effectiveness of assessment	Assessment committee	Indirect (survey, course report) Direct (blue print)
Quality of learning resources	Students	Students survey
Extent of achievement of course learning outcomes	Peer Reviewer	Direct
Quality of learning resources	Peer Reviewer	Direct

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	