



T-104
2022

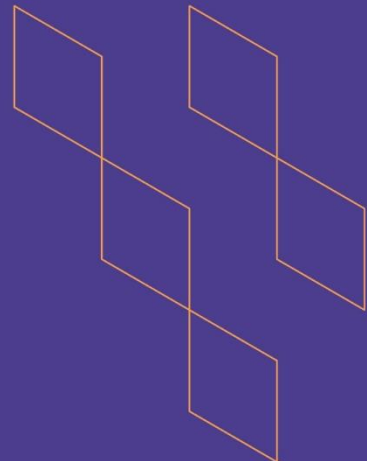
Course Specification





T-104
2022

Course Specification



Course Title: Medicinal Chemistry-1
Course Code: PHC-311
Program: Pharmaceutical Sciences
Department: Pharmaceutical Chemistry
College: Pharmacy
Institution: Najran University
Version: CS-V1
Last Revision Date: 20-12-2023



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A. General information about the course:

Course Identification

1. Credit hours: 3 (2+1)

2. Course type

a. University ☐ College ☒ Department ☐ Track ☐ Others ☐

b. Required ☒ Elective ☐

3. Level/year at which this course is offered: 5th Level/3th year

4. Course general Description

The course describes the medicinal chemistry of an important class of drugs that act on the Autonomic Nervous System. The therapeutic agents that are used to treat many of the CNS-based disorders are studied such those disorders results from insufficiency of the neurotransmitters or their excesses and how to correct them by means of drugs. Also the course teaches the drugs acting on cardiovascular system, drugs acting on urinary system and their applications. The course exposes the students to the study of SAR, mechanism of action and the pharmacokinetics of these drugs i.e., absorption, distribution, metabolism and excretion of these agents and the factors that may affect them. The practical part deals with demonstrating and training student for synthesis of some selected drugs.

5. Pre-requirements for this course (if any): PHC-211

6. Co- requirements for this course (if any): None

7. Course Main Objective(s)

- Identify functional groups and ring systems that characterize each of the drug classes.
- Identify the structural features and functional groups important for the pharmacological actions(s) of each drug class.
- Recognize how tiny changes in structural features and functional groups may affect potency and activity of each drug class.
- Understand the mechanism of action (where known) of the various drugs.
- Make intelligent hypotheses about the biological activity, mechanism, and/or metabolism of an unknown compound based on the structural features found in the molecule.
- Describe the cross-reactivity between drug classes based on structure-activity relationships.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	30	100
2.	E-learning		
3.	Hybrid <ul style="list-style-type: none"> Traditional classroom E-learning 		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	30
3.	Field	
4.	Tutorial	
5.	Others (specify)	30
	Total	90

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Describe basic medicinal chemistry concepts, principles, and theories concerning structure activity relationship about ANS Drugs, cardiovascular and the diuretic drugs.	K3	Lectures Assignment	Theoretical Exams / Assignment
2.0	Skills			
2.1	Predict metabolism pathways of known related drug.	S1	Lectures Assignment	Theoretical Exams / Assignment
2.2	Predict suitable synthetic pathways and purification of known related drug.	S1	Practical work	Practical exams
2.3	explain the major activity and pharmacokinetic properties of a given drug based on the chemical structure	S5	Assignment	Theoretical Exams Assignment
3.0	Values, autonomy, and responsibility			
3.1	Demonstrate accountability, confidence, and use properly the chemicals according to the rules of good laboratory practice	V4	Practical work	observation card



C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Medicinal Chemistry. <ul style="list-style-type: none"> - Definition of medicinal chemistry - Drug nomenclature - Chemical bases for drug action - Biological structures that interact with drugs (receptors, nucleic acids, lipids, and ion channel) - Drug specificity, selectivity, and binding forces to its site of action - Structure activity relationship SAR - Principals of drug actions (functional groups, acid base chemistry, physicochemical properties) 	4
2.	Classification of Drugs <ul style="list-style-type: none"> - Reversible enzyme inhibitors - Irreversible enzyme inhibitors - Transition state analogues - Natural substrate agonists and antagonists (Substrate mimic and competitive inhibitors) 	4
---	Prodrugs <ul style="list-style-type: none"> - Carrier linked prodrug. - Bio precursors 	3
	Drug Metabolism <ul style="list-style-type: none"> - First phase metabolism - Second phase metabolism 	3
	Autonomic Nervous System Drugs: <ul style="list-style-type: none"> - Adrenergic drugs - Antiadrenergic drugs - Cholinergic drugs - Anticholinergic drugs 	5
	Cardiovascular System <ul style="list-style-type: none"> - Antihypertensive Drugs - Treatment of Angina Pectoris - Treatment of Heart Failure - Agents used in hyperlipidemia 	5
	Drugs used in disorders of coagulation	3
	Drugs acting on urinary system	3
Total		30
Practical section		
List of Practical experiments		
1- General Information & Lab safety 2- Basic Instructions in Conducting Organic Synthesis 3- Synthesis of Dihydropyrimidines (Ca-Channel Blockers) (Part I) 4- Synthesis of Dihydropyrimidines (Ca-Channel Blockers) (Part II) 5- The Fischer indole synthesis 6- Synthesis of 3-methyl-1H-pyrazol-(4H)5-one 7- Synthesis of 3,4-dihydro-1-hydroxy-4-oxophthalazine 8- Synthesis of a Coumarin anticoagulant		30
Total		60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quiz-1	5	5
2.	Midterm exam	7-9	20
3.	Quiz-2	10	5
4.	Assignments	15	5
5.	Observation card and workplace-based assessment	2-14	5
6.	Practical quiz or lab report	15	10
7.	Final Practical exam	16	10
8.	Final Written exam	17-19	40
Total			100

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	<ul style="list-style-type: none"> Wilson and Gisvolds Textbook of Organic Medicinal and Pharm. Chemistry, 12th edition.
Supportive References	<ol style="list-style-type: none"> An Introduction to Medicinal Chemistry (6th edition) by Graham L. Patrick PowerPoints slides
Electronic Materials	http://www.dlaf.nu.edu.sa/ http://www.drugdesign.com/web/
Other Learning Materials	<ol style="list-style-type: none"> Microsoft word software. Microsoft PowerPoint software.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	<ol style="list-style-type: none"> Suitable lecture room equipped with data show and internet and enough seats. Suitable laboratories equipped with health and safety tools, internet, and enough seats.
Technology equipment (projector, smart board, software)	Computers, data show, sound systems and internet
Other equipment (depending on the nature of the specialty)	<ul style="list-style-type: none"> Melting point apparatus Oven Condenser Magnetic Hot Plate Stirrer Water bath

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Head of department Students	Indirect Direct
Effectiveness of student's assessment	Faculty members Students	Indirect Direct

Assessment Areas/Issues	Assessor	Assessment Methods
Quality of learning resources	Students	Questioners(indirect)
The extent to which CLOs have been achieved		
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Pharmaceutical Chemistry Department Council
REFERENCE NO.	Council No.
DATE	20/12/2023