



Course Specifications

Course Title:	Principles of Drug Actions and Metabolism
Course Code:	PHRM 225
Program:	Pharm.D
Department:	Intradisciplinary
College:	Pharmacy
Institution:	King Saud University

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A. Course Identification

1. Credit hours:
2. Course type
a. University <input type="checkbox"/> College <input checked="" type="checkbox"/> Department <input type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: 4th level/2nd year
4. Pre-requisites for this course (if any): PHRM 212: Pharmaceutical Organic Chemistry
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	34	80%
2	Blended	4	10%
3	E-learning	4	10%
4	Distance learning		
5	Other		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	42
2	Laboratory/Studio	
3	Tutorial	
4	Others (specify)	
	Total	42

B. Course Objectives and Learning Outcomes

1. Course Description

This course deals with the introduction to basic principles of pharmacology and receptor functions, the functional group properties, pharmacokinetics and receptor interactions in relation to pharmacological action. Furthermore, the course is a study of the classification of metabolizing enzymes, enzyme kinetics and regulations, drug transport, and drug biotransformation.

2. Course Main Objective

Demonstrate the basic principles of pharmacology including drug action and pharmacokinetics in addition to the biochemical aspects of drug metabolism related to pharmaceutical principles.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Explains principles of pharmacology	1.1.1
1.2	Explain relationship between chemical structure and biological activity	1.1.2
1.3	Define the chemical and biochemical mechanisms of drug action.	1.1.1
1.4	Indicate basic principles that affect drug release from dosage forms, drug absorption, distribution, metabolism, excretion, and toxicology and the impact of those properties on clinical pharmacokinetics and pharmacodynamics.	1.1.2
2	Skills :	
2.1	Comprehend the effect of drug chemical structure on its interaction with a receptor to give a physiological response.	2.6.1
2.2	Predict the drug metabolism based on its chemical structure.	2.6.2
2.3	Justify the effects of physicochemical properties on absorption, distribution, metabolism and excretion	2.1.4
2.4	Calculate some physicochemical properties of drugs using Henderson-Hasselbalch equation	2.6.4
3	Values:	
3.1	Conducting group presentations and writing self and group reports.	3.2.1
3.3		
3...		

No	List of Topics	Contact Hours
1	Basic concepts in Pharmacology: Drug targets, pharmacokinetics and pharmacodynamics	2
2	Principles of Drug Absorption, Distribution & Metabolism and Elimination (ADME)	1
3	Physicochemical Properties in Relation to Biological Activity	1
4	Water solubility and acid-base properties	2
5	Lipophilicity, partition coefficient and membranes and tissues	1
6	Introduction to drug action and drug metabolism	1
7	Biotransformation: Introduction, substrate and enzyme theory	2
8	Enzymes involved in Drug Metabolism (Oxidases, reductases, transferase,,)	2
9	Biotransformation: Phase I (FUNCTIONALIZATION) metabolic reactions	4
10	Biotransformation: Phase II (CONJUGATION) metabolic reactions	3
11	Stereochemistry and drug metabolism	1
12	Pharmacologically active metabolites	1
13	Factors affecting drug metabolism (Age, sex ...)	1
14	Metabolic stability of drugs	2
15	Quantitative structure–activity relationship (QSAR) and drug design (different programs used in it)	2
16	Mechanisms of Drug Action: Receptor and Non-receptor mechanisms	1

17	Drug Receptors, Drug Receptor Interactions and regulations (D-R covalent and non covalent)	3
18	Dose-Response Functions: affinity, efficacy and potency, Dose response Curves and types of agonists and antagonists	3
19	ED50, LD50 and Therapeutic Index, and Drug Tolerance, Tachyphylaxis, Idiosyncrasy	1
20	Drug-drug interactions: Principles and types	1
21	Enzymes involved in Drug Metabolism (Oxidases, reductases, transferase,,)	2
22	Drug-drug interactions: Enzyme induction and inhibition	1
23	Drug-drug interactions: Mechanisms of adverse drug reactions	1
24	Drug-food interactions	1
25	Types and Subtypes of Receptors: How receptors mediate their actions?	2
Total		42
Lab content		
No	List of Topics	Contact Hours
1		
2		
3		
4		
5		
...		
Total		

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	Explains principles of pharmacology	1- Lectures. 2- Independent study from textbooks.	1- MCQ. 2- SAQ.
1.2	Explain relationship between chemical structure and biological activity		
1.3	Define the chemical and biochemical mechanisms of drug action.		
1.4	Indicate basic principles that affect drug release from dosage forms, drug absorption, distribution, metabolism, excretion, and toxicology and the impact of those properties on clinical pharmacokinetics and pharmacodynamics.		
		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	

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		linking the particular content of the presentation to the general overview.	
2.0	Skills		
2.1	Comprehend the effect of drug chemical structure on its interaction with a receptor to give a physiological response.	1-Explanations and examples given in lectures 2- Assignment tasks include some open ended tasks designed to apply predictive, analytical and problem solving skills. 3- Class discussions. 4-Case studies related to the course topics.	1- Problem solving questions. 2- Direct discussion about the topic 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.
2.2	Predict the drug metabolism based on its chemical structure.		
2.3	Justify the effects of physicochemical properties on absorption, distribution, metabolism and excretion		
2.4	Calculate some physicochemical properties of drugs using Henderson-Hasselbalch equation		
3.0	Values		
3.1	Conducting group presentations and writing self and group reports.	1- Individual assignments require use of library reference material and web sites to identify information required to complete tasks 2-Writing self and group reports.	1- Assessment of group assignment includes contribution of individual component.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework and assignments	Every lecture	10%
2	First Midterm Exam	6 th week	25%
3	Second midterm Exam	11 th week	25%
4	Final Exam		40%

#	Assessment task*	Week Due	Percentage of Total Assessment Score
	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	<ul style="list-style-type: none"> - Medicinal Chemistry for students - Fundamentals of Medicinal Chemistry and Drug Metabolism - Basic and Clinical Pharmacology (15th ed.) by Bertram G. Katzung, Anthony J. Trevor
Essential References Materials	<ul style="list-style-type: none"> o Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry, by John H. Block and John M. Beale. o Principle of Medicinal Chemistry; by William O. Foye, et al. o Rang and Dale's Pharmacology (9th ed)
Electronic Materials	LMS,
Other Learning Materials	QSAR TOOLBOX software

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Regular classrooms
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show, smart board, free QSAR software
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

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)
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	