

PHAR772 Advanced Pharmacological Sciences

Second Semester 2023-2024

Course Catalog

3 Credit Hours. This comprehensive pharmacology course emphasizes recent advances in the understanding of pharmacological principles. The course appraises the cellular and molecular biology of signal transduction and will provide a more detailed discussion of the molecular pharmacology of receptors, channels and enzymes. This course will focus also on receptor theory, receptor-ligand interactions, receptors and signal transduction, protein structure-activity relationships, concepts of protein scaffolding and trafficking, genomic regulation of drug action, and pharmacogenomics. Many of these aspects will be reviewed in the context of how defects in such molecular processes produce pathological diseases.

Teaching Method: On Campus

	Text Book
Title	Introduction to Protein Structure
Author(s)	Carl Branden and John Tooze.
Edition	2nd Edition
Short Name	Ref#1
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information	
Ref #2	Rang & Dale's PHARMACOLOGY	H P Rang, J M Ritter, R J Flower, and G Henderson.	9th Edition		
Ref #3	Plasmid 101 - Addgene 2 e-book	Addgene Team	4th Edition		
Ref #4	Protein Kinase C: Structure, Function, and Regulation.	Alexandra C. Newton	1st Edition	Paper	
Ref #5	Crystal Structure and Allosteric Activation of Protein Kinase C-Beta II. Thomas A Leonard, etal.				
Ref #6	Molecular dynamics simulation for all.	Scott A Hollingsworth and Ron O Dror.	1st Edition	Paper	
Ref #7	2.2 A Refined Crystal Structure of the Catalytic Subunit of cAMP-Dependent Protein Kinase Complexed with MnATP and a Peptide Inhibitor.	Jianhua Sheng, etal.	1st Edition	Paper	
Ref #8	Crystal Structure of the Cys2 Activator-Binding Domain of Protein Kinase C8 in Complex with Phorbol Ester.	Gongyl Zhang, etal.	1st Edition	Paper	
Ref #9	High-Throughput Screening: The Hits and Leads of Drug Discovery- An Overview.	Martis E A, Radhakrishnan R, and Badve R R.	1st Edition	Paper	
Ref#10	The MTT Assay: Utility, Limitations, Pitfalls, and Interpretation in Bulk and Single-Cell Analysis.	Mahshid Ghasemi, etal.	1st Edition	Paper	
Ref#11	Flow Cytometry: An Overview.	Katherine M McKinnon	1st Edition	Paper	
Ref #12	Basic Methods of Cell Cycle Analysis.	Anna Ligasov, lvo Frydrych, and Karel Koberna.	1st Edition	Paper	
Ref#14	Western Blot: Technique, Theory, and Trouble Shooting.	Tahrin Mahmood and Ping-Chang Yang.	1st Edition	Paper	
Ref #13	Annexin V-Affinity Assay: A Review on an Apoptosis Detection System Based on Phosphatidyl serine Exposure.	Manon van Engeland, etal.	1st Edition	Paper	
Ref #15	Protein kinase C-delta inactivation inhibits the proliferation and survival of cancer stem cells in culture and in vivo.	Zhihong Chen, etal.	1st Edition	Paper	

	Instructor				
Name	Dr. Rasha Khader				
Office Location	M5 - L-4				
Office Hours					
Email	rekhader@just.edu.jo				

Section 1: Lecture Time: Sun, Tue, Thu : 11:30 - 12:30 Room: فاعة الكندي/صينلة

Tentative List of Topics Covered					
Weeks	Торіс	References			
Week 1	Proteins: Amino acids, metal atoms, rotamers, and interactions in protein function.	Chapter 1 From Ref #1			
Week 1	Proteins: Folding and domains.	Chapter 6 From Ref #1			
Week 2	Workshop: The structure-function relationship of proteins and proteins in therapy.	From Ref #4 , From Ref #5			
Weeks 3, 4	Proteins: Prediction, engineering, and design of protein structures.	Selected software packages and Chapter 17 From Ref #1			
Week 7	Student assignment (1) discussion: Structure-function relationship of proteins.				
Week 5	Proteins: Molecular dynamics and simulations.	From Ref #6			
Week 6	Proteins: Determination of protein structures in wet lab settings.	Chapter 18 From Ref #1			
Week 8	Receptors and receptor-ligand interactions: An overview.	Chapters 11, 12, and 13 From Ref #1			
Weeks 9, 10	Receptor-ligand interactions: An in-depth discussion.	From Ref #5 , From Ref #7 , From Ref #8			
Weeks 10, 11	Workshop: Computational methods in pharmacological investigation of receptors and their ligands.	From Ref #9			
Weeks 12, 13	Receptors and receptor-ligands interactions: Wet lab methods in pharmacological investigation of receptors and their ligands.	From Ref #10 , From Ref #11 , From Ref #12 , From Ref #14 , From Ref #13			
Weeks 13, 14	Pharmacogenetics, biopharmaceuticals, and gene therapy: A discussion.	Selected topics From Ref #3, From Ref #15			
Weeks 15, 16	Drug development: A discussion.	Chapter 60 From Ref #2			

Mapping of Course Outcomes to Program Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Learn the recent advances in the understanding of pharmacological principles regarding proteins, their folding and structure prediction, and their structure- function relationship; and the experimental methods currently used and developed to test these principles and to be able to discuss the principles and the methods, then apply some of these methods to certain principles.	40%	Midterm Exam, Assignment (1), Final Exam
Learn the recent advances in the understanding of pharmacological principles regarding receptors (including channels and enzymes), signal transduction, and receptor-ligand interactions in-depth and the experimental methods currently used and developed to test these principles and to be able to discuss the principles and the methods, then apply some of these methods to certain principles.	40%	Midterm Exam, Assignment (2), Final Exam
Learn the recent advances in the understanding of pharmacological principles regarding pharmacogenomics and how defects at the genomic level can affect upstream and downstream cell components and the experimental methods currently used and developed to test these principles and be able to discuss the principles and the methods, then apply some of these methods to certain principles.	20%	Final Exam

PL01.1 PL02.1 PL03.2 PL03.3 PL02.2 PL02.3 PL02.4 PL03.1 PL03.4 PL03.5 PL03.6 PL04.1 PL04.2 PL04.3 PL04.4 PL0	Relationship to Program Student Outcomes (Out of 100%)															
	PL01.1	PLO2.1	PLO3.2	PLO3.3	PL02.2	PLO2.3	PLO2.4	PLO3.1	PLO3.4	PLO3.5	PLO3.6	PLO4.1	PLO4.2	PLO4.3	PLO4.4	PL05.1

Evaluation			
Assessment Tool	Weight		
Midterm Exam	20%		
Assignment (1)	10%		
Assignment (2)	20%		
Final Exam	50%		
	Policy		

Exams	The format for the exams includes multiple-choice questions and short essay questions. Grades will not be given out via e-mail.
	Makeup exams should not be given unless there is a valid excuse. Arrangements to take an exam at a time different than the one scheduled MUST be made prior to the scheduled ex

Cheating and academic dishonesty	The commitment of any acts of cheating and deceit such as copying during examinations, altering examinations for re-grade, plagiarism of assignments, and in any way representing the policy will be applied. Student disciplinary regulations at the university can be found here: chrome- extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.just.edu.jo/aboutjust/RegulationsTemp/41%20%D9%86%D8%B8%D8%A7%D9%85%20%D8%AA%D8%A3%D8%AF% The university now requires all students to read and agree to the following code of conduct during exams: JUST requires all students to read and agree to the new exam rules, which are uploaded to E-learning at the beginning of the semester.
	In this course, all forms of electronic devices (phones, tablets, smartwatches, etc.) need to be turned off completely during exams. Headphones, earphones, and hats are forbidden du If any of the above items are required during the exam (e.g., for medical reasons), the student is required to communicate this with the teacher beforehand. Any breach of the above will result in a strict punishment.
Classroom etiquette	As a student of JUST, you are expected to behave in class. This means respecting your teacher and your classmates. Talking and misbehaving are completely not tolerated and migh above.
Attendance	Excellent attendance is expected. JUST attendance system automatically assigns a ZERO grade (35%) if a student misses a total of 20% of classes. If you miss class, it is your respo
Participation	As postgraduates, you are expected to participate in the discussion in class and are encouraged to ask questions.
Withdraw from course	Last day to drop the course is before the 12th week of the current semester.
Students with special needs	Students with special needs are encouraged to communicate their needs with their teacher as soon as possible to make sure all arrangements they need are set early in the semeste
Contact in writing	To contact the teacher via email, you need to title the email with ?Your student ID ? MSc ? Module number?. For example, ?00000 ? MSc ? PHAR772.? Do NOT write the entire content of the email in the title. Do NOT write very long emails. Rather, book a slot during office hours to discuss the issue. Only emails from JUST domain will be read and replied to. Emails sent from personal emails (e.g., Gmail) will be immediately deleted. Only three forms of contact are allowed, email, Teams, and E-learning. Contacting the teacher via nonprofessional platforms (e.g., messenger) is prohibited.
Office hours visits	As an MSc student, your visits are expected to be lengthy. Therefore, before visiting the teacher during office hours, you need to book a slot using your Outlook calendar. Students who book slots will have priority over students who do not. This is to ensure that students have the time and confidentiality they need to discuss their issues during the visit.

Date Printed: 2024-03-09