



كلية الصيدلة جامعة الزيتونة الأردنية
Faculty of Pharmacy
Al-Zaytoonah University of Jordan

" نحو تعليم صيدلاني متميز "
Toward Excellence in Pharmaceutical
Education

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Al-Zaytoonah University of Jordan
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Faculty of Pharmacy



"Tradition and Quality"

Detailed Course Description - Course Plan Development and Updating Procedures/ Pharmacy Department	QF02/0408-3.0E
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Faculty	Pharmacy	Department	Pharmacy
Course number	0201412	Course title	Drug Design
Number of credit hours	1	Pre-requisite/co-requisite	201313, 201211, 201335

Brief course description

This course is designed to impart the knowledge in computational methods and drug design approaches. It will explore computational chemistry methods and their application in drug design. It is proposed to introduce the knowledge of hit discovery, lead identification, lead optimization, target selection, and molecular recognition employing computer-aided drug design software. And, it will shed the light on computer-based methods, combinatorial chemistry, high-throughput screening, and database mining.

Course goals and learning outcomes	
Goal 1	✓ To explore computational chemistry and their application in drug design.
Learning outcomes	1.1 Emphasize on the general principles of drug design and drug action from an organic chemical perspective rather than from the perspective of specific classes. 1.2 Be familiar in recent developments in key issues such as combinatorial chemistry, QSAR, recombinant technology, and molecular modeling. 1.3 Distinguish drug design approaches and their applications.
Goal 2	✓ To introduce the knowledge of hit discovery, lead identification, lead optimization, target selection, and molecular recognition employing computer-aided drug design software.
Learning outcomes	2.1 Discuss new trends in drug discovery and development. 2.2 Explore ligand-based design approach and pharmacophore significance. 2.3 Explore structure-based design approach and structure alignment.
Goal 3	✓ To shed the light on computer-based methods, combinatorial chemistry, high-throughput screening, and database mining.
Learning outcomes	3.1 Recognize computational methods categories and their applications. 3.2 Distinguish molecular and quantum mechanics tactics. 3.3 Discuss molecular dynamic simulation and its application.
Textbook	1. An Introduction of Medicinal Chemistry, 4 th edition, Graham Patrick, Oxford University Press, 2008.



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	2. Foye's Principles of Medicinal Chemistry, 6 th edition, Thomas L. Lemke and David A. Williams, Lippincott Williams & Wilkins, 2008.
Supplementary references	1. Burger's Medicinal Chemistry and Drug Discovery, 6 th edition, M. E. Wolff, 2003. 2. The Organic Chemistry of Drug Synthesis, Vol. 1-6, D. Lednicher and L. A. Mitscher, John Wiley and Sons.

Course timeline

Week	Number of hours	Course topics	Pages (textbook)	Notes
1	1 1 1	Molecular Modeling <ul style="list-style-type: none"> - Computational Methods. - Potential energy. 	Textbooks 1-4/	
2	1 1 1	Molecular Modeling <ul style="list-style-type: none"> - Molecular mechanics - Quantum Mechanics 	Textbooks 1-4/	
3	1 1 1	Molecular Modeling <ul style="list-style-type: none"> - Conformational analysis - Molecular Dynamic Simulation (MD) - X-ray crystallography - Superposing 	Textbooks 1-4/	
4	1 1 1	Structure-Based Drug Design (SBDD) <ul style="list-style-type: none"> - Molecular Docking 	Textbooks 1-4/	
5	1 1 1	Structure-Based Drug Design (SBDD) <ul style="list-style-type: none"> - Molecular Docking Software 	Textbooks 1-4/	



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6	1 1 1	Combinatorial Chemistry - General Aspects. - Parallel Synthesis. - Solid Phase Technique.	Textbooks 1-4/	
7	1 1 1	Combinatorial Chemistry - Split synthesis: peptide libraries. - Anchors. - Protecting Groups.	Textbooks 1-4/	
8	1 1 1	Ligand-Based Drug Design (LBDD) - Pharmacophore modeling - Quantitative Structure-Activity Relationships (QSAR)	Textbooks 1-4/	
9	1 1 1	Ligand-Based Drug Design (LBDD) - Methods to correlate physicochemical parameters with biological activity. - Equations and Graphs	Textbooks 1-4/	
10	1 1 1	Ligand-Based Drug Design (LBDD) - Physicochemical Parameters - Hydrophobicity - Electronic Property	Textbooks 1-4/	
11	1 1 1	Ligand-Based Drug Design (LBDD) - Steric Property - Hansch Analysis. - De Novo Method.	Textbooks 1-4/	



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12	1 1 1	Ligand-Based Drug Design (LBDD) - Enhancement Factor. - Topliss Schemes. - COMFA	Textbooks 1-4/	
13	1 1 1	Case Study I: Design of ACE Inhibitors	Textbook 1/	
14	1 1 1	Case Study II: Current Research into Antidepressant Agents	Textbook 1/	

Theoretical course evaluation methods and weight	First exam 25% Second exam 25% Final exam 50%	Practical (clinical) course evaluation methods	Semester students' work = 50% (Reports, research, quizzes, etc.) Final exam = 50%
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Approved by head of department		Date of approval	
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Extra information (to be updated every semester by corresponding faculty member)

Name of teacher	Dima A. Sabbah, Ph.D.	Office Number	227
Phone number (extension)	311	Email	dima.sabbah@zuj.edu.jo
Office hours	10-11 (Sun., Tue.) 11-12 (Mon., Wed.)		