Philadelphia University
Faculty of Pharmacy
Department of Pharmaceutical Science
First Semester, 2017/2018

Course Syllabus

Course Title: Drug Design	**Course code: 0510412**
Course Level: 5th level	**Course prerequisite (s) and/or co-requisite (s): Medicinal Chemistry-3 (0510411)**
Lecture Time:	**Credit hours: 2 hours**

Academic Staff Specifics

		Name	Rank	Office Number and Location	Office Hours	E-mail Address
coordinator	Lecturer	Dr. Bilal Al-Jaidi	Assistant Professor	Pharmacy, Room 511		bjaidi@philadelphia.edu.jo

Course module description:

The subject deals with the most commonly used approaches in the design and development of new pharmaceutical agents based on the available information related to the structure activity relationships, the physicochemical characteristics, pharmacokinetic, Pharmacodynamic properties of drugs. Also describes the importance of studying the receptor and enzyme structure in the design of suitable chemical scaffolds for agonist and antagonist activity. The rest of the course will focus on the use of different modeling software and chemical drawing to study the drug-target interaction. Part of the class will focus on drug metabolism and its role in drug design, as well as the prodrug concept.

Course module objectives:

Student will be able to have full knowledge of the recently and widely used methods for the design of new drugs to tackle certain illness such as cancer, bacterial infection, diabetes and many others. Furthermore, the student will be able to utilize computer software such as ChemDraw and Biological receptors visualizer to draw drug structures in 3D view, in addition to study the binding of drugs to the receptors active sites. At the end of the course, student will be able to design and propose suitable drug interties for a given target enzyme or receptor.

Course/ module components

Text book:

The organic chemistry of drug design by Richard B. Silverman. Second edition, Elsevier, 2004

Teaching methods:

Lectures as power point presentations, seminars and discussion groups

Learning outcomes:

1. Knowledge and understanding:

a. Understanding the common concepts of computer aided drug design techniques
b. Building a relationship between drug structure and Pharmacological action
c. Demonstrate knowledge about drug chemical structure and lead optimization to improve activity
d. Interpret data obtained from bioassays to improve pharmacokinetic and Pharmacodynamic properties of drugs
e. Recognize structural moieties essential for drug target interactions and predict possible structural changes to improve binding
f. Get familiarize with different modeling softwares for drawing chemical compounds as well as drug binding simulation
g. Study biological targets at molecular level, their 3D structure, binding energy and kinetics

2. Cognitive skills:

a. Identify parameters and building blocks for drug molecules based on their biological target
b. Use information obtained from virtual screening of targets to design different drug molecules
c. Highlights the importance of simulation softwares in predicting drug target interactions to improve activity
d. Understanding the importance of continuous development of new drugs to overcome resistance tolerance and failure of therapy
e. Develop critical thinking and problem solving.

3. Communication skills:

a. Communicate with colleges for studying biological targets using special softwares
b. Gain the spirit of working in groups and two-way discussion
c. Express ability to interpret data obtained by the team and make conclusions

4. Transferable skills:

a. Use the different concepts and procedures used for drug design to develop methods and platforms helping in design of new drug entities
b. Use results obtained from drug comparison at the biological level to improve patient as well as physician knowledge on the best drug selection and possible outcomes expected of the use
c. Demonstrating ability to work with others in teams.
d. Demonstrate ability to search and use the literature in both printed and electronic formats

Assessment instruments

Allocation of Marks	
Assessment Instruments	Mark
First examination	20
Second examination	20
Final examination: 40 marks	40
Reports, research projects, Quizzes, Home works, Projects	20
Total	100

Documentation and academic honesty

• Documentation style: taking notes during the discussion and recording the voice of instructors
• Protection by copyright
• Avoiding plagiarism.
• Ethics and Disability Act:
- Students may consult with one another on solutions, but copying another student's code is strictly prohibited.
- Students should write their own code. Using code found on books or internet is prohibited.
- The Instructor follows general university “Academic Dishonesty/Cheating Policy”.

Course/module academic calendar

week	Basic and support material to be covered
(1)	Introduction to drug design and discovery
(2)	Study of the lead compound
(3,4)	Lead modification and lead optimization
(5)	Drawing chemical compounds using computer software
(6) First examination	Study of Drug-receptor interactions
(7)	Study of Drug-enzyme interactions
(8)	DNA-interactive agents
(9,10)	Concept of computer aided drug design
(11,12) Second examination	Ligand-based drug design 3D visualizer softwares
(13)	Structure-based drug design
(14)	Prodrug approach Carrier-linked prodrugs
(15)	Prodrug approach Bioprecursors
(16) Final examination	New approaches in drug design and drug targeting

Expected workload:

On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

Attendance policy:

Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

Module references

1- The organic chemistry of drug design by Richard B. Silverman. Second edition, Elsevier, 2004
2- An introduction to Medicinal Chemistry by Graham L. Patrick. Fourth edition, Oxford, 2009