2ed term, 2020

The Department of Biotechnology Engineering

MSc in Biotechnology program

43106 Drug Design and Development course - Syllabus

The course aim is to provide a framework of basic drug design and development, into which current and future drugs may be fitted. The difference between innovative and generic drugs will be discussed. Principles such as: methods for drug discovery, drug targets, the concept of Structure Activity Relationship (SAR) and Quantitative Structure Activity Relationship (QSAR) and optimization of the drug interactions with the target will be studied. Those principles will be applied in two computational laboratory exercises.

Credit points: 2.5

Hours: 2 lecture hours, 1 tutorial/computational laboratory hour.

Prerequisites: Organic chemistry, Physical chemistry, Biochemistry

Class meetings: Thursday 16-19

Instructors: **Dr. Dafna Knani** , E-mail dknani@braude.ac.il

Dr. Idit Golani , E-mail igolani@braude.ac.il

Office hours:

Text books:

1. **An Introduction to Medicinal Chemistry**, G.L. Patrick, 5th ed, Oxford University Press, 2013
2. **Rang & Dale's PHARMACOLOGY**, Rang H.P, Ritter J.M, Flower R.J and Henderson G., 8th ed., Elsevier, 2016.

Evaluation:

Written work	55%
Oral presentation	30%
Laboratory	10%
Exercises	5%

Attending 80% of the class meeting and all the laboratory meetings is compulsory.

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Drug Design and Development *

Lecture	Topics	Subject in book
1-3	Introduction to pharmacology	Book 2# Chap 8,9,10
4	Stages in drug design and development	Book 1# Chap 1,9,10
5	Drug targets: Enzymes and receptors	Book 1# Chap 3,4,7,8
6	Methods for drug discovery and finding lead compound	Book 1# Chap 12
7	The concept of Structure Activity Relationship (SAR); The pharmacophore	Book 1# Chap 13
8	Optimization of drug interactions with the target	Book 1# Chap 13, 14
9	Computational tools used for drug design and development	Book 1# Chap 13, 14, 17
10	Quantitative Structure Activity Relationship (QSAR)	Book 1# Chap 14.9, 17
11	Computational laboratory: prediction of toxicity using QSAR	
12	Tools for protein-ligand docking	Book 1# Chap 18
13	Computational laboratory: Designing new drugs using ligand docking	
14	Students oral presentation	

*The program may be altered

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Bibliography

1. **"Principles of Medicinal Chemistry",** Edited by Foye, W.O., Lemke, T.L. and Williams, D.A., 5th edition, Williams and Wilkins Pubs., Philadelphia, 2008.
2. **"Introduction to the principles of drug design and action"**,Edited by H. John Smith. ,4th ed, SMI 2006.
3. **"Burgers medicinal chemistry and drug discovery" ,** Alfred Burger, 5th ed. New York, John Wiley & Sons, 1997**.**
4. **"Contemporary drug synthesis"**, Jie Jack Li ... [et al.]. Hoboken, NJ : Wiley-Interscience, 2004.
5. **Drug Design: Structure- and Ligand-Based Approaches,** Edited by Kenneth M. Merz, Dagmar Ringe, Charles H. Reynolds, Cambridge University Press; 2010
6. **"Drug-like Properties: Concepts, Structure Design and Methods: from ADME to Toxicity Optimization",** Edward Kerns and Li Di**,** Academic Press, 2008
7. **"Computational Drug Design",** David C. Young, Wiley, 2009
8. **"Recent Advances in QSAR Studies",** Edited by Tomasz Puzyn, Jerzy Leszczynski, Mark T.D. Cronin, Springer 2010

Databases:

- American Chemical Society
- RSC - The Royal society of Chemistry
- ScienceDirect
- Scifinder Scholar on the web
- Taylor & Francis Online
- Wiley Online Library

http://www.uspto.gov

http://www.epo.org/index.html

U.S. Food and Drug Administration