

## The Hebrew University of Jerusalem

Syllabus

## *Organic Chemistry for Medicine & Dentistry Students - 69120*

*Last update 20-09-2016* 

HU Credits: 4

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: chemistry

<u>Academic year:</u> 0

<u>Semester:</u> 1st Semester

<u>Teaching Languages:</u> Hebrew

<u>Campus:</u> E. Safra Ein Karem

Course/Module Coordinator: Norman Metanis

Coordinator Email: metanis@mail.huji.ac.il

Coordinator Office Hours: Upon demand

<u>Teaching Staff:</u> Dr. Norman Metanis Ms. Avia leader Ms. Ms. rebecca dardashti Ms. yuval tarrab Ms. Nitzan Ganot

## Course/Module description:

Introduction to organic chemistry, compounds, reactions and mechanisms.

Course/Module aims:

To learn the fundamentals of organic chemistry

Learning outcomes - On successful completion of this module, students should be able to:

• Analyze and apply stereochemistry, isomerism and conformational considerations.

• Describe and evaluate the structure and reactivity of alkanes, alkenes, alkyl halides, alcohols, aromatic compounds, carbonyl compounds and carboxylic acid derivatives

Assess reaction mechanisms

• Apply the concept of electrophile-nucleophile relationship in organic reactions

• Apply addition, elimination and substitution (electrophilic and nucleophilic) reactions to various organic molecules

• Demonstrate the practical skills required for organic synthesis.

<u>Attendance requirements(%):</u> No Attendance is required

Teaching arrangement and method of instruction: lectures and exercises

Course/Module Content:

• Electronic structure and bonding acids and bases (mandatory reading from the course book, overview).

• An introduction to organic compounds; nomenclature, properties, structures: Alkanes, isomers, nomenclature of alkyl substituents, cycloalkanes, alkyl halides, conformations. • Alkenes; structure, nomenclature, reactivity: Electrophilic addition to alkenes, carbocation stability, delocalization of electrons, Markovnikov's Rule, carbocation rearrangements.

• Stereochemistry: Isomers, cis-trans, enantiomers, diastereomers, meso compounds, stereochemistry of electrophilic addition reactions to alkenes.

• Delocalization and resonance, Dienes: Benzene, stability contributed by resonance, nomenclature, structure, isomers and reactions of dienes.

• Reactions of alkanes.

• Substitutions and eliminations; alkyl halides, Griniard reactions.

• Aromaticity: Definition, stability of aromatic compounds, reactions of aromatic compounds.

• Carbonyl compounds: Definition, structure, properties, reaction of carbonyl compounds.

## <u>Required Reading:</u>

*Electronic structure and bonding acids and bases; according to chapters of 4th edition:* 

1: Mandatory self reading (Background of Basic Chemistry; not part of this course) 2: An introduction to organic compounds; nomenclature, properties, structures (60-94)

3-4: Alkenes; structure, nomenclature, reactivity (3: 111-126, 135-138; recommended: 126-135; 4: 141-145, 147-181)

5: Stereochemistry (182-237)

6: Alkynes (238-246, 249, 250-254, 254-262)

7: Delocalization and resonance (263-275, 278-286)

8: Dienes (298-308, 313-314, 315-317)

9: Reactions of alkanes (338-340, 346-349)

10-12: Substitutions and eliminations; alkyl halides, alcohols, ethers, epoxides, Griniard reactions (10: 360-390; 11: 400-417, 422-436; 12: 437-457, 466-470) 15: Aromaticity (594-610, 612-616)

17-19: Carbonyl compounds (17: 670-675, 676-677, 681-682, 683-695, 695-697, 702-706, 710-713; 18: 731-740, 743-750, 753, 755-757, 761-766, 769; 19: 788-796, 799-800, 804-816, 818-825)

Bioorganic compounds; carbohydrates, proteins, lipids, nucleic acids (22: 921-926, 934-937, 943-949; 23: 959-964, 973-976, 989-993; 26: 1075-1079, 1082-1083, 1097-1098; 27: 1106-1110, 1118-1122, 1128)

Additional Reading Material:

<u>Course/Module evaluation:</u> End of year written/oral examination 100 % Presentation 0 % Participation in Tutorials 0 % Project work 0 % Assignments 0 % Reports 0 % Research project 0 % Quizzes 0 % Other 0 %

Additional information: