

| | | |
|--|---------------|-----------------|
| Course: Organic Chemistry | | |
| Language: English | | |
| Lecturer: Silvana Raić-Malić, full professor Tatjana Gazivoda Kraljević, associate professor | | |
| TEACHING | WEEKLY | SEMESTER |
| Lectures | 2 | 30 |
| Laboratory | 2 | 30 |
| Seminar | | |
| | | Overall: 60 |
| | | ECTS: 5 |

PURPOSE:

The objective of the course is to give students the knowledge required to understand the basic principles of modern organic chemistry and how to use the fundamental knowledge of organic chemistry in industry.

THE CONTENTS OF THE COURSE:

1st week: Introduction to carbon compounds and chemical bonds; classes of carbon compounds, functional groups; nomenclature of organic compounds; Introduction to organic reaction: acids and bases;

2nd week: Alkanes and cycloalkanes: nomenclature, conformational analysis, introduction to synthesis

3rd week: Alkenes and alkynes: properties and synthesis, elimination and addition reactions, stereochemistry.

4th week: Stereochemistry: structural isomers and stereoisomers, optical activity, enantiomers and chiral molecules, diastereoisomers, relative and absolute configurations, the biological importance of chirality.

5th week: Partial exam I

6th week: Alkyl halides: ionic reaction: nucleophilic substitution (S_N1 i S_N2) and elimination reactions (E1 and E2), stereochemistry of reactions

7th week: Alcohols and ethers: structure and nomenclature, synthesis and reactions, organometallic compounds

8th week: Aldehyde and ketones: nomenclature, synthesis, nucleophilic addition to the carbonyl group, reduction reactions, reactions of alpha-hydrogen

9th week: Aromatic compounds: aromaticity, properties, the Kekulé structure of benzene, nomenclature of benzene derivatives, inductive and resonance effects; Mechanism of electrophilic aromatic substitution and reactions of substituted benzenes

10th week: Partial exam II

11th week: Carboxylic acids and their derivatives (esters, anhydrides, amides): nomenclature, synthesis and reactions, nucleophilic addition-elimination reaction at the acyl carbon

12th week: Amines: nomenclature and structure of amines, basicity of amines,

synthesis of amines; Hydrocarbons: nomenclature, structure, properties and reactions. Radical reactions; polymers

13th week: Introduction to structure determination of organic compounds: infrared spectroscopy (IR), nuclear magnetic resonance (NMR) and mass spectrometry (MS)

14th week: "Green chemistry" - principles and application of green reactions in organic chemistry and industry

15th week: Partial exam III

GENERAL AND SPECIFIC COMPETENCE:

Qualifying students to connect and use the terms of organic chemistry, to understand, analyse and apply the chemical transformations and mechanisms for alkanes, alkenes, alkynes, alkyl halides, alcohols, aromatic and carbonyl compounds

KNOWLEDGE TESTING AND EVALUATION:

Exams related to laboratory practices.

3 partial written tests during the semester (60% of points on each of the exams brings the release of the oral examination).

Written exam (50% of the points needed for passage).

Oral examination.

MONITORING OF THE COURSE QUALITY AND SUCCESSFULNESS:

Student questionnaire.

LITERATURE:

1. T.W.G. Solomons, "Organic Chemistry", Eight edition, John Wiley & Sons, New York, USA, 2004.

2. K.P.C. Vollhardt, N.E. Schore, "Organic Chemistry: Structure and Function", Fifth edition, W.H. Freeman and Company, New York, USA, 2007.

3. L.G. Wade, "Organic Chemistry", Sixth edition, Pearson Education, Inc., New Jersey, USA, 2006.

4. J. Clayden, N. Greeves, S. Warren, P. Wothers, "Organic Chemistry", Oxford University Press, New York, USA, 2001.