Study program: Integrated academic studies of pharmacy

Type and level of the study program: integrated academic studies

Course title: ORGANIC CHEMISTRY II (PhII-OCHEM)

Teacher: Mihalj M. Poša, Ana S. Pilipović

Course status: compulsory

ECTS Credits: 6

Condition: General Chemistry; Inorganic chemistry; Organic chemistry I

Course aim

The aim of this course is to offer undergraduates an opportunity to receive knowledge on the basic concepts of statistical stereochemistry, as well as elementary issues in chemistry of carbohydrates and heterocyclic compounds, being important components of a majority of medications.

Expected outcome of the course:

The main goal of this course is offer students knowledge on stereochemistry of simple organic molecules, in order to apply their knowledge on organic compounds with a pharmacological significance. Students should also apply their knowledge on properties and chemical transformations of monosaccharides and heterocyclic compounds during further course of studies. Students need to acquire skills for working with molecular models, in order to easier understand the space which chosen types of organic molecules take. They are also required to master skills for organic synthesis lab work in order to apply them in other similar laboratories

Course description

Theoretical education

1. Introduction into stereochemistry;
2. Conformational analysis;
3. Molecular symmetry and asymmetry;
4. Racemic modifications;
5. Prochirality;
6. Asymmetrical synthesis;
7. Use of proton NMR in organic molecular structure determination;
8. Carbohydrates;
9. Monosaccharide reactivity;
10. Monosaccharides with abnormal structure;
11. Disaccharides;
12. Polysaccharides;,
13. Heterocyclic compounds;
14. Five-membered heterocyclic systems with one heteroatom (**furan**, thiophene and **pyrrole**, indoel),
15. Six-membered heterocyclic systems with one heteroatom (pyridine, benzopyridine, pyrane and derivates);,
16. Five-membered heterocyclic systems with two heteroatoms (pyrazole, imidazole, isoxazole, oxazole, isothiazle, thiazole);
17. Six-membered heterocyclic systems with twoheteroatoms (pyridazine, pyrimidine, pyrazine, morpholine);
18. Condensed heterocyclic systems(purine, pteridine);
19. Seven-membered heterocycic systems (azepines, oxepines, thiepines, diazepines).

Practical education: exercises, other forms of education, research related activities

1. Using molecular models in lab work;
2. Preparation of all solvents which will be used for certain preparations;
3. Assignment of proton NMR spectra of organic compounds;
4. Preparation ofpentaacetate α-D-glucopramose;
5. Preparation ofpentaacetate β-D-glucopyranose;
6. Preparation of phenylosazone D-glucose;,
7. Preparation ofpyrroles;
8. Preparation of2-methylindoles;
9. Preparation of2,4,6-trimethyl- 3,5-Diacetyl-1,4-dihydropyridines;
10. Preparation of2,5-dimethylpyrazole;
11. Preparation of2-phenyl-4(D-arabino-tetrahydroxy butyl)-1,2,3triazole;
12. Preparation of4-oxo-3,4-dihydro-1,2,3-benztriazine

Literature

Compulsory

1. Vollhardt KPC, Schore NE. Organic chemistry: structure and function fourth edition. USA, 2003

Additional

1. Yurkanis Bruice P. Organic chemistry, fourth edition. Pearson Education, 2004.

Number of active classes				Other:
Lectures: 30	Practice: 45	Other types of teaching:	Research related activities:	

Teaching methods: lectures, laboratory practice

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures	5	Written	30
Practices	25	Oral	5
Colloquium	30	.....	
Essay	5		