



Study program: Doctoral Academic Studies in Biomedical Sciences		
Course title: STRATEGIES IN ORGANIC SYNTHESIS OF COMPLEX MOLECULES		
Teachers: Mhalj M. Poša, Ana S. Pilipović, Vesna B. Tepavčević, Zita J. Farkaš Agatić, Kosta J. Popović		
Course status: elective		
ECTS Credits: 20		
Condition: -		
Course aim Planning organic synthesis of complex compounds. Application of retrosynthetic analysis. The overarching goal is to implement gained knowledge from Organic chemistry 1 and Organic chemistry 2 (where chemical reactions are observed isolated, on small molecules) on complex molecules		
Expected outcome of the course: Students are expected to master the integral knowledge of application of organic chemical reactions, stereochemistry and conformational analysis in order to discover new active compounds or improve the activity of already existing molecules		
Course description		
<i>Theoretical education</i>		
<ol style="list-style-type: none"> 1. Retrosynthetic analysis 2. Building blocks in organic synthesis 3. Principles of protection and deprotection 4. Carbon-carbon bond forming reactions 5. Carbon-oxygen bond forming reactions 6. Carbon-nitrogen bond forming reactions 7. Carbon-sulfur and carbon-phosphorus forming reactions 8. Synthesis of cyclic systems 9. Principles of condensation reactions in deriving heterocyclic compounds 10. Influence of conjugated functional groups 11. Reactions of oxidation and reduction 12. Reactions of polymerisation 13. Usage of combinatorial chemistry in synthesis of polypeptides, proteins and RNK 14. Stereoselective and stereospecific reactions 15. Programming organic molecules 16. Automatisation of organic synthesis: robots in organic synthesis 17. Methods of purification of complex organic molecules 18. NMR and IR characterisation of organic compounds 		
<i>Practical education</i>		
<ol style="list-style-type: none"> 1. Homologation reactions of organic compounds 2. Enantiomer separation 3. Methods for introducing organic functional groups (protection and deprotection) 4. Conformational analyses 5. Synthesis and retrosynthesis analysis (and discussion about possible improvement of drug activity) of following drugs: androgen compounds, aldosterone antagonists, synthetic estrogens, non-steroid estrogen antagonists, antidepressant based on dihydroanthracens, anthraquinones: the antrone chemotherapy agents, benzomorphans, analgesics based on nonfused piperidines, thiazoles and related sulphur-nitrogen containing heterocycles, 3-ketopirimidines, barbiturates, quinolines, antimalaria compounds, antibacterial quinolines, benzodiazepines, anxiolytic agents, seven-membered heterocycles fused to benzene ring, dibenzodiazepines, dibenzoxazepines and dibenzothiazepines, azadibenzodiazepines 		
Literature		
Compulsory:		
<ol style="list-style-type: none"> 1. Strategies for organic drug synthesis, Daniel Lednicer, John Wiley & sons, New York, 1999. 		
Number of active classes	Theory: 60	Practices: 45
Teaching methods		
Theoretical and practical teaching.		

Student activity assessment (maximally 100 points)

lectures: 10

practices: 20

written exam: 70