

<b>Study programme: PhD in Biology</b>				
<b>Level:</b> Doctoral degree				
<b>Course title:</b> Bioinformatics in the study of nucleic acids and proteins				
<b>Lecturer:</b> dr Edward Petri, dr Jelena Purać				
<b>Status:</b> elective				
<b>ECTS:</b> 15				
<b>Requirements:</b>				
<b>Learning objectives</b>				
The course will introduce students to bioinformatics concepts and methods used in the analysis of nucleic acids and proteins in biological research.				
<b>Learning outcomes</b>				
After completing the course, students should be able to understand and use different commercially available programs for the analysis of nucleic acids and proteins. Also, students should learn to apply bioinformatics to solve specific biological problems.				
<b>Syllabus</b>				
<i>Theoretical instruction</i>				
Bioinformatics is an integrated discipline of biology, mathematics and programming, which has broad applications in various scientific fields. Most of today's biological research uses some biological databases, as well as methods for studying the organization, structure, function and evolution of biological macromolecules. During this course, students will learn the most important concepts, methods and tools used in bioinformatics analysis of nucleic acids and proteins. Students will learn about the following topics: a) biological databases of nucleotide and amino acid sequences and how to search for information in biological databases b) database similarity searching c) determining alignments for nucleotide and amino acid sequences, d) determination of phylogenetic trees, e) analysis of the structure and function of biological macromolecules and f) the links between genes and the structure of biomolecules – the structural basis of genetic conservation.				
<i>Practical instruction</i>				
Students will be required to write term paper that will be consistent with the theoretical material covered in the course, as well as the subject they deal with for their doctoral research.				
<b>Literature</b>				
Vinay Sharma (2008) Text Book of Bioinformatics, Rastogi Publications				
Jenny Gu, Philip E. Bourne (2011) Structural Bioinformatics, second edition, Wiley-Blackwell				
<b>Weekly teaching load</b>				Other:
Lectures: 5	Exercises:	Other forms of teaching:	Student research: 5	
<b>Teaching methodology</b>				
Theoretical instruction will be taught in lectures or consultations. Practical instruction will be done using computers.				
<b>Grading method (maximal number of points 100)</b>				
Term paper: 70 points				
Course activity: 30 points				