Course Unit Descriptor

Study Programme: PhD in Molecular Biology

Course Unit Title: Bioinformatics in the study of nucleic acids and proteins

Course Unit Code: DMB021

Name of Lecturer(s): Assoc. Prof. Željko Popović, PhD; Assoc. Prof. Edward Petri, PhD

Type and Level of Studies: Doctoral Studies

Course Status (compulsory/elective): Elective

Semester (winter/summer): Summer

Language of instruction: English

Mode of course unit delivery (face-to-face/distance learning): Face-to-face

Number of ECTS Allocated: 15

Prerequisites: None

Course Aims:

The course will introduce students to bioinformatics concepts and methods used in the analysis of nucleic acids and proteins in biological research.

Learning Outcomes:

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.

Syllabus:

Theory

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 aced 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.

Practice

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.

Required Reading:

Vinay Sharma (2008) Text Book of Bioinformatics, Rastogi Publications

Jenny Gu, Philip E. Bourne (2011) Structural Bioinformatics, second edition, Wiley-Blackwell

Weekly Contact Hours: 10	**Lectures:** 5	**Practical work:** 5

Teaching Methods:

Lectures and students practical work.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Active class participation	30	written exam	70
Practical work		oral exam	