

Study programmes: PhD studies - Informatics				
Course name: R408 - Bioinformatics				
Lecturers: Gordana Pavlović-Lažetić and other lecturers of the Department of Computer science and informatics				
Status: Optional				
ECTS: 9				
Attendance prerequisites: No prerequisites				
Course aims: Acquiring knowledge about advanced bioinformatical methods and mathematical methods applied in this area. This course is intended to be an introductory bioinformatics course. It is not suitable for students that had experience with bioinformatics on lower levels of studies.				
Course outcome: After the course, a student is capable of further studying and individual scientific work in bioinformatics.				
Course content:				
1. Basis of molecular biology: proteins, nucleic acids, protein biosynthesis				
2. Public databases of nucleotides/proteins; software for processing				
3. String algorithms: string comparison algorithms - brute force, BM, KMP, automata; suffix trees, suffix arrays; applications; motif search (palindroms, repeats)				
4. Alignment methods: double, multiple alignment; dynamics programming methods; heuristic methods - BLAST, FASTA;				
5. Phylogenetics trees; methods and algorithms for their				
6. Hidden Markov Models(HMM); applications - string alignment, prediction				
7. Genome sequencing and assembly				
8. Data mining in bioinformatics				
Literature:				
1. Biological sequence analysis: Probabilistic models of proteins and nucleic acids, R. Durbin, S. Eddy, A. Krogh, G. Mitchison, Cambridge University Press, 1998.				
2. (parts of book) Algorithmic Aspects of Bioinformatics, Hans-Joachim Böckenhauer, Dirk Bongartz, Springer, 2007.				
3. (parts of book) Bioinformatics, Andrzej Polanski, Marek Kimmel, Springer, 2007. (lecturer may opt for other suitable current literature)				
Number of hours: 10	Lectures: 4	Tutorials: -	Laboratory: -	Research: 6
Teaching and learning methods: Frontal, group, individual and practical.				
Assessment (maximal 100 points)				
Course assignments	points	Final exam		points
Lectures	-	Written exam		-
Exercises / Tutorials	-	Oral exam		60
Colloquia	-	Written-oral exam		-
Essay / Project	40			