

Study program / course: Mechanical Engineering			
Type and level of study: Master academic studies			
Course: Bioengineering and Bioinformatics			
Lecturers: Nenad D. Filipovic, Milan Micunovic, Gordana Jovicic			
Status of course: Obligatory for module M ₇ , II semester			
Number of ECTS: 6			
Precondition: Mechanics I, Mechanics II, Mathematics I, Mathematics II, Fluid mechanics, Thermodynamics			
The objective of course Objective of course is introducing of students with application of bioengineering and bioinformatics in modeling of cardiovascular systems, functional heart process with muscle contraction, multiscale modeling, biochemical reaction modeling, bioinformatics databases, sorting and searching in bioinformatics.			
The outcome of course After this course and final exam from course Bioengineering and Bioinformatics, students can be involved in scientific projects from this new and very popular interdisciplinary science. Students will get knowledge from basic bioinformatics, parallel systems and bioinformatics databases in modeling and simulation coupled problems of cardiovascular systems.			
Syllabus Theoretical study Basic principles in cardiovascular biomechanics. Circulatory system. Force and resistance of blood flow. Newtonian law of fluid motion. Turbulence. Blood rheology. Circulatory mechanism. Heart, electrical system. Hear mechanics. Valvules motion. Active contraction. Solid-fluid interaction. Experimental tissue deformation. Constitutive relation. Blood flow in arteries. Basic bioinformatics. Parallel systems in bioinformatics. Applied bioinformatics in medicine.			
Practical classes Practices, Research study. Laboratory work: Modeling of one problem from cardiovascular biomechanics.			
Recommended reading 1. Filipovic, N., Modeling and simulation of cardiovascular system, WUS Austria, University of Kragujevac, 2005. 2. Filipovic, N., Basic Biomechanics, manuscript, Faculty of Mechanical Engineering, Serbia, 2008. 3. Fung, Y. C. Biodynamics: Circulation, Springer-Verlag, 1984.			
The number of hours of active teaching:			Other classes:
Theory: 2	Practical classes: 1.6	Other forms of teaching: 0.4	Research study: 0
1			
Methods of teaching			
Evaluation of knowledge			
Pre-final exam obligations	points	Final exam	points
Activities during the classes:	5		
Practical classes:			
Colloquiums(s) :		Oral exam	30
Seminar(s) :	65		