

Study Programme: Biomedical engineering			
Course Unit Title: Neuroengineering			
Course Unit Code: BMI113			
Name of Lecturer(s): Mejić Luka, Ilinčić Branislava			
Type and Level of Studies: Bachelor			
Course Status (compulsory/elective): compulsory			
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: 6			
Prerequisites: none			
Course Aims: Students learn about modern technologies and development trends in the field of neuroengineering.			
Learning Outcomes: Introduction to engineering techniques used for better understanding the properties of nervous system. Options for improving the functionality of nervous system in the case of various pathologies. Introduction to techniques for solving the design problems at the interface of living neural tissue and machines. Mechanisms of sensory-motor system functioning. Sensory and motor disorders and possibilities of restoration and augmentation of human function via direct interactions between the nervous system and artificial devices (Brain Computer Interface – BCI and neural prostheses). The use of neural implants connected with external technology.			
Syllabus. Introduction to Neuroengineering. Applying engineering techniques to analyse the properties of neural system. Applying engineering techniques to analyse the properties of neuromuscular system. Analysis in time and frequency domain. Electromyography (EMG), basic characteristics of EMG signal. Electroneurography (ENG), basic characteristics of ENG signal. Nerve conduction velocity measurement. Basic characteristics of EEG signal. Clinical electroencefalography. Evoked potentials, methods for processing evoked potentials. Nervous system modelling methods. Brain mapping methods. Transcranial magnetic stimulation. Brain Computer Interface (BCI) technology. Control interface and biofeedback.			
Required Reading:			
Weekly Contact Hours: 2	Lectures: 3	Practical work: 0	
Teaching Methods: Lectures. Computer practice. Laboratory practice. Consultations.			
Knowledge Assessment (maximum of 100 points):			
Pre-exam obligations	points	Final exam	points
Attendance			
Computer exercises			
Tests (4x)			

