Course Unit Descriptor

Study Programme: Biomedical engineering
Course Unit Title: Fundamentals of Neural Prosthesis
Course Unit Code: BMI114
Name of Lecturer(s): Jorgovanović Nikola, Knežević Aleksandar
Type and Level of Studies: Bachelor
Course Status (compulsory/elective): compulsory
Semester (winter/ summer): winter
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 neural prostheses.
Learning Outcomes: The acquired knowledge is used in solving practical engineering problems in the field of neural prostheses. The physiological base of neural prostheses. Acquiring knowledge about structures of modern electronic simulators and their projection. The introduction of different types of neural prostheses, the principals of their functioning, hardware and algorithms. The basic principles of projecting neural prostheses.
Syllabus. The basic operating principles of neural prosthses. Neural prosthesis as a functional replacement for natural biological systems. Neural prosthetic system design. The effects of electromagnetic fields on the sensory-motor mechanisms. Therapeutic effects of electrical and magnetic stimulation. Design of electronic neuromuscular stimulators. Functional electrical stimulation (FES). Pacemakers and defibrillators. Phrenic nerve pacing. Motor prosthetics for control of movement (restitution of grasping, standing and walking). Sensory function restitution-sensory prosthetics (auditory prosthetics – cochlear implants, visual prosthetics). Bladder control implants. Prosthetics for pain relief. Muscle exercises.
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)			