

Obuda University John von Neumann Faculty of Informatics		Institute of Applied Informatics		
Name and code: <i>Biomedical Engineering (NAIBEISEND)</i>		Credits: 5		
<i>Computer Science and Engineering BSc specialty</i>		<i>Full-time, 2014/15 year II. semester</i>		
Subject instructors: Dr. Levente Kovács, Dr. Tamás Ferenci, Dr. Miklós Kozlovsky, Dr. Tamás Haidegger, Johanna Sájevicsné Sági				
Prerequisites (with code):				
Weekly hours:	Lecture: 4	Seminar.: 0	Lab. hours: 0	Consultation: 0
Way of assessment:	midterm grade			
Course description:				
<p><i>Goal:</i> Biomedical engineering appeared in the XXth century as an interdisciplinary research topic. Its aim is to efficiently support the medical science by the latest engineering and computer science achievements. The literature divides in 13 topics the field of biomedical engineering: physiological modeling and control, medical imaging, biomaterials, biotechnology, tissue engineering, biomedical instrumentation, rehabilitation engineering, medical and bioinformatics, clinical engineering, biosensors, medical signal processing, biomechanics, prosthetic devices and artificial organs. The aim of the lecture is to give an overview of the presented sub-topics, presenting the current research stage of them and the researches done at the Obuda University.</p> <p><i>Course description:</i> Biomedical engineering is rapidly spreading although its interdisciplinary nature. It is mostly focusing on electrical engineering and informatics. Among its thirteen topics, during the lecture the following topics will be discussed: physiological modeling, simulation and control; medical informatics; medical imaging; biomedical signal processing; e-Health, m-Health; remote medical systems; decision support systems, biosensors; biomechanics; medical robotics.</p>				

Lecture schedule	
Education week	Topic
1.	Introduction to Biomedical Engineering. General presentation (Dr. Levente Kovács) – 12.02.2015
2.	Physiological and pathophysiological modeling, identification and control 1 (Dr. Levente Kovács) – 19.02.2015
3.	Physiological and pathophysiological modeling, identification and control 2 (Johanna Sájevicsné Sági) - 26.02.2015
4.	Biostatistics. Its aim and scope. Introduction to evidence based medicine. (Dr. Tamás Ferenci) – 05.03.2015.
5.	Surgical robotics. Computer integrated surgery (Dr. Tamás Haidegger) – 12.03.2015
6.	Image-guided surgery, intraoperative navigation systems 1 (Dr. Tamás Haidegger) – 19.03.2015
7.	Holiday – 26.03.2015
8.	Image-guided surgery, intraoperative navigation systems 2 (Dr. Tamás Haidegger) – 02.04.2015
9.	Introduction to medical imaging, radiology and nuclear medicine. (Dr. Miklós Kozlovsky) – 09.04.2015
10.	Medical imaging (Dr. Miklós Kozlovsky) – 16.04.2015

11.	Medical visualization and medical informatics (Dr. Miklós Kozlovszky) – 23.04.2015
12.	Exam – 30.04.2015
13.	Presentations – 07.05.2015
14.	Replacement presentation and exam possibility - 14.05.2015
Midterm requirements	
Oral presentation on one chosen presented field based on individual orientation. The presentation should be antedated by a written essay on the chosen field discussed with the corresponding lecturer.	
Education week	Topic
13.	Presentations
Final grade calculation methods	
Final mark is calculated as follows: $0.3 \cdot \text{written essay} + 0.3 \cdot \text{oral presentation} + 0.4 \cdot \text{exam}$	
Type of exam	
-	
Type of replacement	
One time on the 14th week	
References	
Obligatory:	
The electronic material from the web-page.	
Recommended:	
Bronzino J.D: The Biomedical Engineering Handbook. CRC Press, 2005. Khoo M: Physiological Control System. Analysis, Simulation and Estimation. IEEE Press, 2000.	
Other materials:	
On the webpage of the lecture.	