Course Unit Descriptor

Study Programme: Biomedical engineering

Course Unit Title: Design and manufacturing of implants and medical models

Course Unit Code: BM119D

Name of Lecturer(s): Budak Igor, Milutinović Mladomir, Puškar Tatjana

Type and Level of Studies: Bachelor

Course Status (compulsory/elective): elective

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: 5

Prerequisites: none

Course Aims:.

Gaining knowledge and skills on theoretical and practical aspects of implants' and medical models' designing and manufacturing, by the application of reverse engineering design and 3D printing technologies.

Learning Outcomes:
Ability to understand the methodology of reverse engineering design and its practical application in the field of biomedical engineering with an emphasis on the use of computed tomography (CT), magnetic resonance imaging (MRI) and systems of optical 3D digitization. Ability to understand the methodology, technological aspects and practical applications of 3D printing in the field of biomedical engineering. Mastering the methodological and practical aspects of the integration of reverse engineering design and 3D printing in the field of biomedical engineering.

Syllabus.
The term, role and importance of reverse engineering design in the field of biomedical engineering. Reverse engineering design methodology. 3D digitization - concepts and methods in the fields of medicine (CT, MRI and optical systems). Pre-processing of the results of 3D digitization. Reconstruction of complex surfaces - generating CAD models. The concept of the role and importance of 3D printing in the field of biomedical engineering. Technological aspects of 3D printing. Biomedical materials for 3D printing. Integration of systems for reverse engineering design and 3D printing.

Required Reading:

Weekly Contact Hours: 2	**Lectures: 2**	**Practical work: 0**

Teaching Methods:
Lectures are realized interactively through lectures, laboratory and computer practical classes. In lectures theoretical part is presented with characteristic examples for better understanding of subject content. Acquired knowledge is practically applied in laboratory practical classes bz the application of avalilable laboratory equipment. Computer exercises comprise the use of information and communication technologies for gaining knowledge and practical skills in the field of study. Apart from lectures and practical classes, consultations are held regularly

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Attendance			
Computer exercises			
Tests (4x)			