

Study program / course: Mechanical Engineering				
Type and level of study: Master academic studies				
Course: Rapid Prototyping				
Lecturers: Grujović A. Nenad				
Status of course: Elective for modules M ₅ and M ₇ , III semester				
Number of ECTS: 6				
Precondition: No				
The objective of course Familiarizing students with the technology of rapid prototyping and its role in modern product development cycles and processes. Training students for the selection and application of technologies for the rapid prototyping and improvement of processes of product development.				
The outcome of course After this course and final exam, students will be able to: apply knowledge about the basic principles of RP, software solutions for RP and the role of the RP technology in the development of products; independent selection of RP technology for prototypes in accordance with techno - economic requirements, as well as the desired quality of prototype and production time, to practically prepare 3D model for the process of RP. Produce prototype on 3D printer and NC miller.				
Syllabus				
Theoretical study The definition of a prototype, the types of prototypes, the role of prototypes; RP technology, characteristics, the benefits of the use of RP, market demands for fast development of products; tree of RP technology. Basic physical-chemical mechanisms. Material properties, influence on process parameters. Limitations of the process. Characteristics and applicability of the leading commercial technologies, software solutions for the creation of layers. STL format; conversion of CAD models in STL, and alternative formats; Supporting structure and setup; Input formats and 3D models reverse engineering - CT, magnetic resonance imaging, laser scanning, CMM. Direct and indirect production tools. Manufacturing of tools based on RP technology, CNC machining. Current trends in the rapid manufacturing (RM). New RP processes; comparison and evaluation of RP technology choice of RP technology, new applications of RP technology.				
Practical classes Using 3D scanning equipment, creation of CAD models based on the existing original sample. Preparation of CAD models for the 3D printing. Using the 3D printer. Post-processing printed models. Individual project for reverse engineering.				
Recommended reading [1] www.elearning.kg.ac.yu [2] N.Grujović: "Rapid Prototyping", Faculty of Mechanical Engineering, 2005 [3] Patri K. Venuvinod, Weiyin Ma, "Rapid Prototyping: Laser-Based and Other Technologies", Kluwer Academic Publishers, 2003 [4] Andreas Gebhardt, "Rapid Prototyping", Hanser, 2000				
The number of hours of active teaching:				Other classes:
Theory: 3	Practical classes: 1.4	Other forms of teaching: 0.6	Research study: 0	1
Methods of teaching Theoretical lectures and exercises in computer lab. Teaching material available on e-learning portal of University e-learning Center.				
Evaluation of knowledge				
Pre-final exam obligations	Points 70	Final exam 30	points	
Activities during the classes:	10	Oral	30	
Practical classes:	20			
Colloquiums(s) :	20			
Seminar(s) :	20			