

Study program / course: Mechanical Engineering				
Type and level of study: Master academic studies				
Course: Digital control				
Lecturers: Milan S. Matijevic, Vesna M. Rankovic				
Status of course: Obligatory for module M5, I semester				
Number of ECTS: 6				
Prerequisite: none				
The course objective: Presenting fundamental knowledge from digital systems and signals: Modeling and analysis of computer supported systems. Computer supported systems with feed back. Digital algorithms – synthesis and implementation. Concept of synthesis of digital systems.				
The course outcome: Fundamental knowledge about modeling principles, analysis and synthesis of digital control systems. Fundamental knowledge about acquisition and modeling of digital signals. Discretization – numerical aspects and implementation aspects. Basic processing algorithms of signals in digital systems – synthesis and implementation. Principle of optimization.				
Syllabus: <i>Theory</i> 1. Introduction. 2. Theoretical ground of signals and systems (recapitulation). 3. Structure of digital control system and sampling. 4. Z transformation and discrete transfer function. 5. Realization and characteristics of discrete transfer function. 6. Concept of stage of digital systems. 7. Stability. 8. Synthesis of digital compensators. 9. Synthesis of digital compensators. 10. Digital control algorithms 11. Synthesis is of conventional digital regulators. 12 Synthesis of digital regulators with more than one inputs. 13. Implementation of digital controller. 14. Introduction in real time systems. Measurement systems and real time control. 15. Examples from practice. <i>Practice:</i> Practical classes, other classes Listed issues will be presented during laboratory exercises working in class with laboratory equipment (implementation of sensors and actuators) and computers (modeling and simulation). Students will be able to perform researches in the field of the course.				
Recommended reading: 1. Milic R. Stojic, Digital control systems, University of Belgrade, Belgrade 1998. 2. Branko D. Kovacevic, Zeljko M. Djurovic, Automatic control systems, Science, Belgrade, 1992 3. Matijevic M., Jakupovic G. Car J. “Computer supported measurement and control” Faculty of Mechanical Engineering, Kragujevac, 2005.				
The number of hours of active teaching:				Other classes: 1
Theory: 2	Practical classes: 1,6	Other forms of teaching: 0,4	Research study: 0	
Methods of teaching Teaching with ex-cathedra approach with multimedia presentations and interactive work with students. Auditoria exercises combine ex cathedra approach and computer tools. Laboratory exercises refer to fields of implementation of sensors and actuators.				
Evaluation of knowledge (maximal 100 points)				
Pre-final exam obligations	Points	Final exam	Points	
Activities during the classes	5	Written		
Activities during the exercises		Oral presentation	50	
Tests:				
Seminars:	45			