No. 32

Course syllabus for First cycle studies						
1.	**Course title**	Computer Process Control				
2.	**Code**	MDE8E6				
3.	**Study Program**	Metallurgical Digital Engineering				
4.	**Study program organizer (unit, institute, department, division)**	Faculty of Technology and Metallurgy, Ss Cyril and Methodious University in Skopje				
5.	**Degree (first, second, third cycle)**	First Cycle				
6.	**Academic year / semester**	IV/8	7.	**Number of ECTS**	6	
8.	**Instructors**	Prof. Vesna Ojleska Latkoska, PhD				
9.	**Prerequisites for course enrollment**	Prior to enrolling the course, the student should have knowledge from the following fields: Signals and Systems and Automatic Control Systems				
10.	**Objectives of the course syllabus (competences):** This subjects introduces the students to the use of computer implemented algorithms for process control, whether the computer is a microprocessor, microcontroller, PC, or an industrial computer. The course also utilizes the previous knowledge of control theory by implementing the known and taught control algorithms using computers, thus coping with both the hardware and software issues of the process. The course therefore makes the students competent to study and design computer controlled processes. **Acquired skills (competences):**					
11.	**Content of the course:** Fundamentals of computer control. Concepts of computer control. Hardware aspects or technical equipment of the computer control systems. Signal inputs and outputs. Control loop elements. Software aspects of the computer control systems: Real time process control; Control using interrupts; Modes of activation of program blocks; Interrupt operation; Computer control of complex systems; Initial approaches to system decomposition; Hierarchical control; Multilayer control; Multilevel control. Linear digital control. Discrete-state computer control systems: Two-state control systems; Sequential systems. Examples of computer control systems: Temperature process control using a microcontroller; Hierarchical control of a brick kiln. Discrete PID controllers and their optimization. Discrete controllers (DC) in state space. Pole-zero cancellation controllers. DC control of processes with large time delays.					
12.	**Study methods:** Combined: presentations, homework, project assignments, practical laboratory work.					
13.	**Total available time**	180				
14.	**Allocation of available time**	2+2+1				
15.	**Teaching activities**	15.1.	Lectures-theoretical teaching	30		
		15.2.	Exercises (laboratory, practice classes), seminars, teamwork	45		
16.	**Other types of activities**	16.1.	Projects, seminar papers	20		
		16.2.	Individual tasks	10		
		16.3.	Homework and self-learning	75		
17.	**Grading system**					
	17.1.	Exams		5		

	17.2.	Seminar work/project (presentation: written and oral)	15
	17.3.	Final Exam	80
18.	**Grading criteria (points/grade)**	Up to 61 points	5 (five) (F)
		From 61 to 69 points	6 (six) (E)
		From 70 to 79 points	7 (seven) (D)
		from 80 to 89 points	8 (eight) (S)
		From 90 to 95 points	9 (nine) (B)
		from 95 to 100 points	10 (ten) (A)
19.	**Prerequisites for taking the final exam**	Regular attendance to the lectures and exercises, as well as successful and timely completion of all laboratory exercises.	
20.	**Language in which lectures are conducted**	Macedonian and English	
21.	**Method for monitoring the quality of lectures**	Internal evaluation and surveys.	
22.	**LITERATURE**		

22.1. Compulsory literature

No.	Author	Title	Publisher	Year
1.	Миле Ј. Станковски, Татјана Колемишевска -Гугуловска	Компјутерско водење на процеси	ЕТФ Скопје	2006
2.	Branko Novakovic	Kompjutersko vodjenje procesa	Sveuciliste u Zagrebu	2001
3.	Karl A Astrom, Bjorn Wittenmark	Computer-Controlled Systems: Theory and Design	Dover Publications	2011

22.2. Additional literature

No.	Author	Title	Publisher	Year
1.	Drago Matko, S. Strmcnik, B. Zupancic, G. Music	Racunalnicko vodenje procesov	Univerza v Ljubljani, FEE	1995
2.				
3.				