Faculty of Electrical Engineering / POWER SYSTEMS AND AUTOMATIC CONTROL / Analog and digital electronics

Course:	Analog and digital electronics			
Course ID	**Course status**	**Semester**	**ECTS credits**	**Lessons** (Lessons+Exercises+Laboratory)
10320	Mandatory	4	7	3+2+1
Programs	POWER SYSTEMS AND AUTOMATIC CONTROL			
Prerequisites	It is desirable that the student passes the exams "Fundamentals of Electrical Engineering I" and "Fundamentals of Electrical Engineering II".			
Aims	Introduction to basic electronic components and circuits. Introduction to basic digital circuits in various manufacturing technologies, as well as the advantages and disadvantages of circuits depending on the manufacturing technology.			
Learning outcomes	After the student passes this exam they will be able to: defines the basic characteristics of semiconductors and pn junctions, explains the basic amplifier characteristics of different types of transistors, examines the mode of operation of bipolar transistors, including the model for small signals, explains the principle of operation and differences between differential amplifier and power amplifier, analyzes simple circuits with operational amplifiers, pulse circuits (CR and RC), interprets the basic schemes of oscillators, stabilizers and rectifier circuits, analyzes and draws voltage waveforms in characteristic points of multivibrator circuits, distinguishes basic types of A / D and D / A converters.			
Lecturer / Teaching assistant	Prof. dr Srdjan Stanković			
Methodology	Lectures, exercises, consultations, independent work			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Fundamentals of semiconductor physics			
I week exercises	Fundamentals of semiconductor physics			
II week lectures	Diode			
II week exercises	Diode			
III week lectures	Bipolar transistors, basic amplifier couplings			
III week exercises	Bipolar transistors, basic amplifier couplings			
IV week lectures	Field effect transistors, Current sources			
IV week exercises	Field effect transistors, Current sources			
V week lectures	Differential amplifier. Push-pull amplifier			
V week exercises	Differential amplifier. Push-pull amplifier			
VI week lectures	Negative feedback. Operational amplifier.			
VI week exercises	Negative feedback. Operational amplifier.			
VII week lectures	Colloquium			
VII week exercises				
VIII week lectures	Operational amplifier applications			
VIII week exercises	Operational amplifier applications			
IX week lectures	Rectifier circuits, filters and stabilizers			
IX week exercises	Rectifier circuits, filters and stabilizers			
X week lectures	Oscillators. Basic impulse circuits (CR, RC) and impulse shapes.			
X week exercises	Oscillators. Basic impulse circuits (CR, RC) and impulse shapes. Schmitt trigger			
XI week lectures	TTL and CMOS circuits			
XI week exercises	TTL and CMOS circuits			
XII week lectures	Minimization of logical functions (Karnaugh maps). Error correction codes			
XII week exercises	Minimization of logical functions (Karnaugh maps). Error correction codes			

XIII week lectures	Astable multivibrators, Monostable multivibrators
XIII week exercises	Astable multivibrators, Monostable multivibrators
XIV week lectures	D / A conversion, A / D conversion
XIV week exercises	D / A conversion, A / D conversion
XV week lectures	Final exam
XV week exercises	Final exam
Student workload	weekly 7 credits x 40/30 = 9 hours and 20 min Structure: 3 hours of lectures 3 hours of laboratory exercises 3 hours and 20 min of independent work, including consultations During the semester Teaching and final exam: (9 hours and 20 min) x 16 = 149 hours and 20 min Necessary preparation before the beginning of the semester (administration, enrollment, certification) 2 x (9 hours and 20 min) = 18 hours and 40 min Total load for the item 7 x 30 = 210 hours Additional work for the preparation of the exam within the remedial examination period, including taking the remedial exam from 0 to 42 hours (time remaining from the first two items to the total load for the subject 150 hours) Load structure: 149 hours and 20 minutes (Teaching) + 18 hours and 40 minutes (Preparation) + 42 hours (Additional work)

Per week	**Per semester**
7 credits x 40/30=9 hours and 20 minuts 3 sat(a) theoretical classes 1 sat(a) practical classes 2 excercises **3 hour(s) i 20 minuts** of independent work, including consultations	Classes and final exam: **9 hour(s) i 20 minuts x 16 =149 hour(s) i 20 minuts** Necessary preparation before the beginning of the semester (administration, registration, certification): **9 hour(s) i 20 minuts x 2 =18 hour(s) i 40 minuts** Total workload for the subject: **7 x 30=210 hour(s)** Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) **42 hour(s) i 0 minuts** Workload structure: **149 hour(s) i 20 minuts (cources), 18 hour(s) i 40 minuts (preparation), 42 hour(s) i 0 minuts (additional work)**
Student obligations	Regular attendance at classes, lab work done, attendance tests
Consultations	After the lecture, or in agreement with the students
Literature	1. S. Stanković, R. Laković: Elektronika, ETF, Podgorica 1999 2. N. Tadić, S. Stanković, N. Lekić, R. Laković, Zbirka riješenih zadataka iz elektronike, ETF Podgorica, 2003
Examination methods	Colloquium 40 points Laboratory exercises 10 points Final exam 50 points
Special remarks	
Comment	

Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points