VIDZEMES AUGSTSKOLA

FACULTY OF ENGINEERING
STUDY COURSE DESCRIPTION

Course Title:	**Electronics**					
Course code (LAIS):	*The course will be registered in the study administration system after accreditation*					
Study programme:	**Mechatronics**					
Level of Study programme:	☒	1st level professional higher education				
	☒	Professional Bachelor				
	☐	Professional Master				
	☐	Academic Master				
	☐	PhD level				
Type of Study programme:	☐	Compulsory course (Part A)				
	☒	Professional specialization courses (Part B, compulsory)				
	☐	Professional specialization optional courses (Part B, optional)				
	☐	Elective courses (Part C)				
Course Workload:	**Credits**		**ECTS**	**Academic hours**	**Contact hours**	**Independent work hours**
	4		6	160	64	96
Course Author/ Tutor:	**Alvis Sokolovs**					
	Lector, Dr.ing					
	e-mail: alvis.sokolovs@va.lv					
	Consultation: according to the schedule for each semester					
Study Form:	Full time studies					
Study year, semester:	2nd year 4th semester					
Language:	Latvian					
Prerequisites for the Course: *(if necessary)*	Electrotechnics					
Course Summary:	Aim of the course: to introduce students to the basics of electronics; to promote practical skills in analyzing and testing electronic circuits. Upon completion of the course, the student must be able to use the acquired knowledge in the assembly of electronic circuits, diagnostics, with the related measurements and calculations.					
Course Methods, including description of the organization of students' individual work and tasks:	Lectures, practical classes, laboratory works, defense of laboratory work, tests in the e-environment, independent work with information sources					
Assessment:	Exam					
Requirements for Credits:	- Timely accomplished and submitted practical works and laboratory works - Laboratory works performed and defended - Practical work, laboratory work and final examination must be successful. The final score consists of: - Assessment of practical work - 30% - Evaluation of laboratory work - 40% - Exam Evaluation - 30%					
Abiding by the Academic Ethics	Students must abide by the academic and research ethics, Vidzeme University of Applied Sciences Ethics Regulations, incl.: – study papers must be independently developed; – the study work should reference all statements, ideas and data used that have been authored by someone else; – appropriate data acquisition methods should be used in the acquisition of data, the research ethics must be respected, empirical data must be collected independently and cannot be distorted or falsified; – the examination must be carried out by the student independently, without the use of supporting materials and/or consultations with other students, unless the lecturer states otherwise. In the event of non-compliance with the academic and research ethics, punishment is imposed in accordance with the ViA Ethics Regulations and the study course must be re-taken, unless the punishment is exmatriculation.					
Learning Outcomes; the	**Learning Outcomes**				**The evaluation methods and criteria**	

evaluation methods and criteria	**Knowledge**	
	Will know and will be able to explain topics and concepts related to the course content: semiconductors, diodes, transistors, operational amplifiers, photodiodes, sensors, logic and digital circuits, analogue digital and digital-analogue converters, signal amplifiers, analogue and pulse power supplies;	Assessment of practical work and laboratory work
	Skills	
	Electronic circuits and documentation reading and analysis;	Assessment of practical work and laboratory work
	Identification of electronic circuits and their components;	Successful execution of laboratory work
	To work with electric measuring instruments	Successful execution of laboratory work
	To work with catalogs and other sources of information, to get information about electronic circuits and the components used in them;	Assessment of practical works and laboratory woks
	Competency	
	Able to describe and explain a simple electronic circuit operation;	Successful execution of laboratory work
	Plan and perform measurements to determine parameters and characteristics of the electronic circuit;	Successful execution of laboratory work
	Identify and eliminate faults electronics circuit operation;	Successful completion of practical work and laboratory work, exam
	To independently acquire new knowledge in the field of electronics.	
Course Compulsory literature:	1. Frohn, Manfred u.c. *Mikroelektronikas komponentes un pamatshēmas - Mācību grāmata II*. Valmiera: VPIC Izdevniecība, 2003. 512 lpp. ISBN 9984-762-01-7 2. Kammerer, Joseff u.c. *Mikroelektronikas shēmtehnika – Mācību grāmata III*. Valmiera: VPIC Izdevniecība, 2008. 300 lpp. ISBN 9984-762-02-5	
Course additional literature:	1. https://punkts.va.lv; https://moodle.va.lv 2. Dzieia, Werner u.c. *Elektronikas elektrotehniskie pamati – Mācību grāmata I*. Valmiera: VPIC Izdevniecība, 2007. 411 lpp. ISBN 9984-762-00-9	
Course confirmation date:	08.12.2022	
Date of course description update:		

Study Course Plan:

Date	Theme	Academic hours		Study Form/ Organization of independent work of students and task description
		Contact hours	**Independent work hours**	
The date is specified before the implementation of the course	**Operational Amplifiers** (OpAmp): basic principles, characteristics and types of OpAmp, OpAmp Application.	4	6	Lecture, practical work, test work in e-environment
	Low Frequency Amplifiers: Parameters and Characteristics; small signal amplifiers; power amplifiers	4	6	Lecture, practical work, test work in e-environment, laboratory work
	Sensors: types, usage. Photo elements and solar batteries. Photo-semiconductors (photodiodes, phototransistors).	4	6	Lecture, practical work, test work in e-environment

	Light emission photo-semiconductors. Light wave cable. Indicators: light diodes (LED) and liquid crystals (LCD) indicators; basic principles, types, usage.	2	4	Lecture, practical work, test work in e-environment
	Logical schemes: basic functions of logical schemes. Analysis of logical schemes, synthesis of logical schemes.	6	8	Lecture, practical work, test work in e-environment, laboratory work
	Schemes of logical memory: RS-trigger, JK-trigger, usage. Frequency dividers.	4	6	Lecture, practical work, test work in e-environment
	Digital schemes: digital microchip series, levels of signal, times of switching. Digital schemes: counters, register of deviation, code transformers – basic principles, usage.	4	6	Lecture, practical work, test work in e-environment, laboratory work
	Digital schemes: registers of memory; structure, addressing and operation of static and dynamic (RAM) memories. Constant memory: ROM, PROM, EPROM, EEPROM, their structure and operation.	4	6	Lecture, practical work, test work in e-environment
	Methods of data transmission: basic principles of data transmission; recognising mistakes. Digital/analogue (D/A) analoque/digital (A/D) transformers; principles of transformation.	4	6	Lecture, practical work, test work in e-environment, laboratory work
	Impulse power units: operational principle, direst voltage transformers, tiristor voltage transformers, through-flow transformers, technical performance of impulse power units.	4	6	Lecture, practical work, test work in e-environment
	Use of microcontrollers for control of electronics circuits	12	14	Lecture, practical work, test work in e-environment, laboratory work
	Computer simulation of electronics circuitry	4	6	Lecture, practical work
	Defense of laboratory work	6	10	
	Examination (workout to exam)	2	6	
	Hours total:	***64***	***96***	