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COURSE SPECIFICATION

Course code	full-time programme:	M#2-S1-ME-208
	part-time programme:	
Course title in Polish	Podstawy elektroniki	
Course title in English	Fundamentals of Electron	ics
Valid from (academic year)	2024/2025	

GENERAL INFORMATION

Programme of study	MECHANICAL ENGINEERING
Level of qualification	first-cycle
Type of education	academic
Mode of study	full-time programme
Specialism	all
Department responsible	Department of Automation and Robotics
Course leader	Dr inż. Adam Szcześniak
Approved by	dr hab. Jakub Takosoglu, prof. PŚk, Dean of the Faculty of Mechatronics and Mechanical Engineering

COURSE OVERVIEW

Course type		programme-specific				
Course status		compulsory				
Language of instruction		English				
Semester of	full-time programme	Semester II				
delivery	part-time programme					
Pre-requisites						
Examination required (YES/NO)		NO				
ECTS value		2				

Mode of instruction		lecture	class	laborator y	project	seminar
No. of hours	full-time programme	15		15		
per semester	part-time programme					

LEARNING OUTCOMES

Category of outcome	Outcome code	Course learning outcomes	Corresponding programme outcome code
Knowlodgo	W01	Knows the basic components used in the construction of electronic devices.	MiBM1_W04
Kilowiedge	W02	Understands the operating principles and characteristics of basic electronic components.	MiBM1_W04







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	W03	Understands the operating principles of basic electronic circuits.	MiBM1_W04
	W04	Knows the principles of working with instruments for measuring electrical quantities, including oscilloscopes.	MiBM1_W04
	U01	Is able to use electronic instruments to measure electrical quantities, including oscilloscopes.	MiBM1_U11
Skills	U02	Can analyze the operation of a simple electronic circuit and determine its parameters based on measurements of electrical quantities at characteristic points.	MiBM1_U11
	U03	Can select the values of components in a simple electronic circuit to achieve specified parameters.	MiBM1_U11
	U04	Is capable of preparing documentation related to conducted research.	MiBM1_U11
Competence	K01	Understands the necessity of continuously updating knowledge in the field of electronics due to the extremely rapid development of this area of technology.	MiBM1_K03

COURSE CONTENT

Type of instruction lecture	Topics covered
lecture	 Definition of electronics, structure of the atom, intrinsic and doped semiconductors. N-p junction, operating states of the n-p junction. Semiconductor diodes: switching, rectifying, capacitive, Zener, Schottky, and tunnel diodes. Characteristics, operation, and applications. Bipolar transistors, characteristics, basic operating configurations. Darlington circuit. Unipolar transistors with junction and insulated gate, characteristics, basic operating configurations. Uncontrolled rectifiers. Thyristors and triacs. Converters. Small-signal transistor amplifiers. Transistor biasing circuits. Interstage coupling. Differential amplifier, push-pull power amplifiers. Operational amplifier. Basic linear circuits with an operational amplifier. Power supply circuits: parametric stabilizers, feedback stabilizers, and switching stabilizers.
laboratory	Instruction on operating laboratory equipment (multimeters, oscilloscopes, generators). Examination of uncontrolled and controlled rectifier circuits. Voltage multiplier. Examination of continuous and switching voltage stabilizers. Bipolar transistors in basic electronic circuits. Single-stage AC signal amplifier, multi- stage amplifier, electromagnetic relay control with a transistor switch. Push-pull power amplifier with a differential amplifier in the driver stage. Applications of operational amplifiers in linear electronic circuits. Summing amplifier, single-pole filter, active filter with multiple feedback.

ASSESSMENT METHODS

Outcome	I	Methods of assessment (Mark with an X where applicable)									
code	Oral examination	Written examination	Test	Project	Report	Other					



Projekt "Dostosowanie kształcenia w Politechnice Świętokrzyskiej do potrzeb współczesnej gospodarki" nr FER5.01.05-IP.08-0234/23



Fundusze Europejskie dla Rozwoju Społecznego



Rzeczpospolita Polska Dofinansowane przez Unię Europejską



W01		х		
W02		х		
W03		х		
W04		х		
U01				х
U02				х
U03				х
U04			х	
K01				х

ASSESSMENT TYPE AND CRITERIA

Mode of instruction	Assessment type	Assessment criteria
lecture	non-examination assessment	Positive completion of the final test. Achieving at least 50% of the points.
laboratory	non-examination assessment	Achieving at least 50% of the points from tests conducted during the classes.

OVERALL STUDENT WORKLOAD

	ECTS weighting											
		Student workload										Unit
No.	Activity type		fu	II-tin aram	ie me			pa	nrt-tir aram	ne		
			C	Lb	P	S	L	C	Lb	P	S	
1.	Scheduled contact hours	15	-	15	•	-	_				-	h
2.	Other contact hours (office hours, examination)	2	2 2									h
3.	Total number of contact hours	34					h					
4.	Number of ECTS credits for contact hours	1,4								ECTS		
5.	Number of independent study hours		16							h		
6.	Number of ECTS credits for independent study hours		0,6								ECTS	
7.	Number of practical hours		25								h	
8.	Number of ECTS credits for practical hours	1								ECTS		
9.	Total study time	50						h				
10.	ECTS credits for the course 1 ECTS credit = 25-30 hours of study time		2				ECTS					

READING LIST

- 1. Horowitz P, Hill W. Sztuka elektroniki tom 1 i 2 . WKiŁ Warszawa 2006
- 2. A.Filipkowski Układy elektroniczne analogowe i cyfrowe. WNT 2003
- 3. Thomas L. Floyd Electronic Devices. Pearson 2018









- 4. Z.Nosal, J.Baranowski Układy elektroniczne. Cz.1 Układy analogowe liniowe. WNT 2003
- 5. J.Baranowski, G.Czajka Układy elektroniczne. Cz.2 Układy analogowe nieliniowe i impulsowe. WNT 1998
- 6. W.Marciniak Przyrządy półprzewodnikowe i układy scalone. WNT 1984
- 7. M.Nadachowski, Z.Kulka Analogowe układy scalone. WKŁ 1980
- 8. P.Górecki Wzmacniacze operacyjne podstawy, aplikacje, zastosowania. BTC 2004
- 9. Katalogi układów elektronicznych (ELFA itp)



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