SYLLABUS

Course description

Course code	Course	**ELEKTROTECHNIKA I ELEKTRONIKA**	
ME/O/I/NST/B10		**ELECTRICAL ENGINEERING AND ELECTRONICS**	
Language of instruction		English	
Academic year		2025/2026	
field of study:		Mechanical Engineering	
field of specialisation:		All	
Educational level		first-cycle studies	
Education profile		General academic	
Mode of study		Part-time studies	
Semester(s)		3	
Affiliation with a group of classes		B. Core subjects	
Course status		Obligatory	
Types of classes, instruction hours, ECTS credits		Types of classes	Number of instruction hours / Number of ECTS credits
		Lecture	16 [h] / 4 ECTS
		Classes	16 [h]
Linkage of the course	with the education profile	Related to the conducted scientific activity in the discipline to which the field of study is assigned	0 ECTS
	with qualifications	It is used to acquire engineering competences by the student	4 ECTS
	with science discipline	Mechanical engineering	4 ECTS
Form of teaching		Traditional – classes organized at the University /classes conducted using online learning methods and techniques	
Prerequisites		Basic knowledge in physics, computer science and mathematics	
Department		Faculty of Mechanical Engineering	
Coordinator		Dr hab.inż. Iwona Komorska	
The website of the basic organizational unit		http://wm.uniwersytetradom.pl	
E-mail address, phone number of the coordinator		48 3617634; iwona.komorska@urad.edu.pl	

LEARNING OUTCOMES, CURRICULUM CONTENT, TEACHING CLASSES, VERIFICATION OF LEARNING OUTCOMES

Learning Objective:	Gaining knowledge in the field of: basic laws of electrical engineering, electronic components and their characteristics, and electronic signal processing. Acquisition of the ability to use the basic laws of electrical engineering in the calculation of electrical circuits and to recognize and analyze simple electronic circuits.
Curriculum Content:	Lecture: Introduction to electrical measurements. Fundamental principles of Ohm's Law. Branch circuits analysis with the Kirchhoff's Current and Voltage Laws. Definition and examples of linear and nonlinear circuit elements. AC circuits. RLC systems. Power and energy. Magnetism (electromagnetism). Principles of transformer operation. Introduction to electric machines. Intrinsic and doped semiconductors. p-n junction. Semiconductor diodes. Rectifiers and filters. Bipolar and unipolar (field) transistors. Electronic systems: voltage and current stabilizers. Amplifiers: transistor and integrated. Fundamentals of digital electronics. Basic logic functors. Introduction to sequential logic circuits. Types of flip-flops: SR, D, JK, and T flip-flops. Decoders. Shift registers. Introduction to microprocessors and microcontrollers. Lab: Voltage, current, and resistance measurements. Practical verification of Ohm's law. Investigation of branched DC circuits. Study of DC circuits containing linear and nonlinear elements. R, L, and C elements in sinusoidal AC circuits. Measurement of power and energy in single-phase systems. Investigation of a single-phase transformer Rectifier diodes - rectifier circuits and filters. Stabilization diodes - current and voltage stabilizers. Transistor. Transistor amplifier. Fundamentals of digital electronics. Gates as basic logical functors. Flip-flops and counters. Decoders, registers. Basics of microprocessor technology.
Didactic (educational) methods:	Conventional lecture using audiovisual means, verbal problem method, laboratory experiment. Laboratory classes conducted at the University on the research stands. Students work in groups, performing laboratory exercises corresponding to the content of education
Course assessment type, the criteria for assessing the achieved learning outcomes, and the method of calculating the final grade:	The condition for passing the course is to achieve all the required learning outcomes specified for a given subject. Obtaining positive grades from the laboratory and lecture is tantamount to passing it and gaining the student the number of ECTS points assigned to this subject. Lecture: the final grade for the lecture is the sum of grades: 100% grade for the written test. Laboratory exercises: the condition for getting credit is to achieve all the required learning outcomes for this form of class and to obtain positive grades using the assessment methods adopted for the subject. The final grade for laboratory exercises is the sum of grades: 40% report, 40% test, 20% activity and independence in class.

Learning outcomes for the course in relation to the field of study learning outcomes and the type of classes				Methods of verifying learning outcomes	
Learning outcome number	Description of the learning outcomes for the course (PEU) A student who has passed the course (**W**) knows and understands / (**U**) can / (**K**) is ready to:	Field of study learning outcome (KEU)	Types of classes	Form of verification (credits)	Methods of testing and assessment
W1	Knows and understands basic laws of electrical engineering, electronic	K_WG 08	lecture	mark	test

	components and their characteristics as well as the construction and principles of operation of electrical machines				
U1	Can connect the simple electrical circuits, conduct electrical measurements with multimeter and oscilloscope and apply basic electrical laws	K_UW 06	lab	mark	Report, test
K1	is ready to supplement and critically evaluate specialist knowledge and is able to select appropriate sources of knowledge and learning methods	K_KK 01 K_KK02	lab	-	report

Literature and teaching aids
Horowitz P., Hill W.: The art of Electronics (3-rd edition), Cambridge University Press, 2015 Wai-Kai Chen: The Electrical Engineering Handbook, Elsevier Inc. 2005 The Electrical Engineering Handbook (e-book) https://www.accessengineeringlibrary.com/binary/mheaeworks/7be1f7b678e2f43c/28464eebae047e5b9793bb6b8c9f634a3ca28dcce21884f6404965d7f6fc0299/book-summary.pdf https://www.electronics-tutorials.ws Dorf R.C.: The Electrical Engineering Handbook, CRC Press

Student workload required to achieve the assumed learning outcomes – the balance of ECTS credits		
Attendance, participation	Student workload [h].	
	Student's self-study hours Classes without a teacher (ZBN)	Classes
Participation in lectures/classes/lab	X	16 [h]/16 [h]
Preparation for lectures/classes/lab , Preparation for ... credit / exam	8 [h]/ 25 [h] 10 [h] /25 [h]	X
Total student workload Preparation for ... credit / exam	68 [h]/ 2,72 ECTS	32 [h]/ 1,28 ECTS
ECTS points per subject	4 ECTS	

Additional information, comments
In the case of students with special needs, including disabilities, and chronic illnesses, the methods and forms of verification of learning outcomes specified above (in the syllabus) are adapted to the individual needs of these students, as appropriate. Detailed rules and forms of support for students with special needs, including those with disabilities and chronically ill, during classes, credits, and exams are specified in: University Regulations (Regulamin Studiów Uniwersytetu Technologiczno-Humanistycznego w Radomiu), Study Regulations (Zasady Studiowania), and Procedure for Ensuring Accessibility of the Educational Process to Students with Special Needs, Including Those with Disabilities and Chronically ill (Procedura dotycząca zapewnienia dostępności procesu kształcenia studentom ze szczególnymi potrzebami, w tym: z niepełnosprawnością, przewlekle chorych).