

SYLLABUS

Course description

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|---|---|--|------------------------|--------|
| Course code | Course | ELEKTROTECHNIKA I ELEKTRONIKA | | |
| MB/O/I/ST/B1.11 | | ELECTRICAL ENGINEERING AND ELECTRONICS | | |
| Language of instruction | English | | | |
| Academic year | 2023/2024 | | | |
| field of study: | Mechanics and machine construction | | | |
| field of specialisation: | All | | | |
| Educational level | first-cycle studies | | | |
| Education profile | General academic | | | |
| Mode of study | Full-time studies | | | |
| Semester(s) | 3 | | | |
| Affiliation with a group of classes | Core subjects | | | |
| Course status | Obligatory | | | |
| Types of classes, instruction hours, ECTS credits | Types of classes | Number of instruction hours | Number of ECTS credits | |
| | Lecture | 30 [h] | 4 ECTS | |
| | Classes | 30 [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 | www.wm.uniwersytetradom.pl | | | |
| E-mail address, phone number of the coordinator | 48 3617634; iwona.komorska@uthrad.pl | | | |

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

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| 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: Basics of electrical measurement (2h). Ohm's law and its application in circuits with one emf source (2h). Branch circuits (2h). AC circuits. RLC systems (2h). Magnetism (electromagnetism) (2h). Electric machines (4h). Intrinsic and doped semiconductors. p-n junction. Semiconductor diodes. Rectifiers and filters (2h). Bipolar and unipolar (field) transistors (2h). Electronic systems: voltage and current stabilizers (2h). Amplifiers: transistor and integrated, generators (2h). Fundamentals of digital electronics. Basic logic functors (2h). Combination patterns (2h). Sequential circuits (2h). Basics of microprocessor technology (2h). Lab: Ohm's law (2h). The basics of connecting branched electrical circuits and their calculation using Kirchhoff's laws (2h). Rectifier diodes - rectifier circuits and filters (2h). Stabilization diodes - current and voltage stabilizers (2h). Bipolar and unipolar transistor (2h). Fundamentals of digital electronics. Gates as basic logical functors (2h). Flip-flops and counters (2h). Decoders, registers (2h). Basics of microprocessor technology (2h). Transistor amplifier (2h). Thyristor and triac (2h). Optoelectronic components (2h). Transformer testing (2h). Testing of DC and AC generators (2h). Testing of DC and AC motors (2h). |
| 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 by 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 classes 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 components and their characteristics as | K_WG 08 K_WG 18 K_WG 19 | lecture | mark | test |

| | | | | | |
|----|---|---------|-----|------|------------------|
| | 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 |
| U2 | Can cooperate and work in a group, assuming various roles in it | K_UO 20 | lab | mark | report, activity |
| 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 | lab | mark | 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) http://www.rollanet.org/~n0klu/Ham_Radio/(eBook)%20Electronics%20-%20The%20Electrical%20Engineering%20Handbook.pdf |
| 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]. | | |
| | Other contact hours (IGK) | Student's self-study hours Classes without a teacher (ZBN) | Classes |
| Participation in ... lectures | X | X | 30 [h] |
| Participation in laboratory classes | X | X | 30[h] |
| Meeting with teachers during their duty hours | 2 [h] | X | X |
| Preparation for lectures/classes/.... , Preparation for ... credit / exam | X | 6 [h]/ 15 [h] 2 [h] /15 [h] | X |
| Total student workload | 2 [h]/ 0,1 ECTS | 38 [h]/ 1,5 ECTS | 60 [h]/ 2,4 ECTS |
| ECTS credits for the course | 100 h/ 4 ECTS | | |

| Additional information, comments |
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| 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, przewlekłe chorych). |

