



Subject card

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|---|--|--|----------|-------------------------------------|---|--|-----|
| Subject name and code | Safety of Electrical Equipment Usage, PG_00038452 | | | | | | |
| Field of study | Electrical Engineering | | | | | | |
| Date of commencement of studies | October 2026 | Academic year of realisation of subject | | | | 2029/2030 | |
| Education level | first-cycle studies | Subject group | | | | Obligatory subject group in the field of study Subject group related to scientific research in the field of study | |
| Mode of study | Full-time studies | Mode of delivery | | | | at the university | |
| Year of study | 4 | Language of instruction | | | | Polish | |
| Semester of study | 7 | ECTS credits | | | | 5.0 | |
| Learning profile | general academic profile | Assessment form | | | | assessment | |
| Conducting unit | Department of Electrical Power Engineering -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | prof. dr hab. inż. Stanisław Czapp | | | | | |
| | Teachers | | | | | | |
| Lesson types | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 30.0 | 0.0 | 15.0 | 0.0 | 0.0 | 45 |
| | E-learning hours included: 0.0 | | | | | | |
| Learning activity and number of study hours | Learning activity | Participation in didactic classes included in study plan | | Participation in consultation hours | | Self-study | SUM |
| | Number of study hours | 45 | | 10.0 | | 70.0 | 125 |
| Subject objectives | To achieve ability of designing and maintenance of electrical devices in the field of electrical safety | | | | | | |
| Learning outcomes | Course outcome | Subject outcome | | | Method of verification | | |
| | K6_W12 | The student interprets effects of current on human beings. Specifies and explains the means of protection against electric shock in LV systems and HV systems. | | | [SW3] Assessment of knowledge contained in written work and projects | | |
| | K6_U11 | By calculation and measurement estimates effectiveness of protection against electric shock in electrical installations. | | | [SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools | | |
| | K6_U05 | The student knows and apply the principles of ergonomics, safety and hygiene at work. | | | [SU1] Assessment of task fulfilment | | |
| | K6_K05 | The student knows the principles of applying the protection devices and rescue of people. | | | [SK5] Assessment of ability to solve problems that arise in practice | | |
| Subject contents | <p>Course content – lecture</p> <p>Electrical safety. Health and safety management systems. Occupational risk assessment. Electric shocks. Effects of current on human beings and livestock, threshold of perception, of let-go, of ventricular fibrillation. Electrical impedance of the human body. Touch voltage and body current. Earthing. Earth electrodes, soil resistivity, earthing resistance and their measurement. Earthing resistance calculation. Protection in low voltage installations. Basic protection. Insulation resistance, leakage currents. Protection in case of fault, additional protection. Calculation and testing. Protection in high voltage installations. Earth fault current calculation. Reduction factors related to earth wires and metal sheaths. Earthing system for HV installations. Measuring touch voltages. Other hazards. Sources of hazards and protection. Work ergonomics and hygiene. LABORATORY Laboratory model for demonstration of means of protection against electric shock. Earthing in LV systems. Conductivity of floor and wall testing. Effectiveness of protection against electric shock testing in installations with RCDs. Earth loop impedance measurement. Earthing electrode resistance measurement. Conductivity of soil measurement. Insulation resistance measurement.</p> | | | | | | |
| Prerequisites and co-requisites | Electrical devices | | | | | | |

| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
|--|--|--|-------------------------------|
| | Written exam | 50.0% | 67.0% |
| | Practical exercise | 100.0% | 33.0% |
| Recommended reading | Basic literature | Czapp S.: Ochrona przeciwporażeniowa w sieciach i instalacjach niskiego napięcia. PWN, Warszawa 2023 | |
| | | Markiewicz H.: Bezpieczeństwo w elektroenergetyce. PWN, WNT, Warszawa 2017. | |
| | Supplementary literature | Musiał E.: Instalacje i urządzenia elektroenergetyczne, WSP, Warszawa 2008. | |
| | eResources addresses | | |
| Example issues/ example questions/ tasks being completed | <p>1. Threshold of let-go for 50 Hz sinusoidal current is:</p> <p>a) 1 mA</p> <p>b) 10 mA</p> <p>c) 30 mA</p> <p>2. A-type residual current devices detect:</p> <p>a) alternating earth fault current and pulsating direct earth fault current</p> <p>b) only alternating earth fault current</p> <p>c) only pulsating direct earth fault current</p> <p>3. Permissible earth potential rise for long duration of current flow in 110/15 kV substation is:</p> <p>a) 80 V</p> <p>b) 160 V</p> <p>c) 50 V</p> | | |
| Practical activities within the subject | Not applicable | | |

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