



Subject card

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|---|---|--|--|-------------------------------------|--|------------|-----|
| Subject name and code | Fundamentals of electrical engineering and electronics, PG_00055878 | | | | | | |
| Field of study | Power Engineering, Power Engineering, Power Engineering | | | | | | |
| Date of commencement of studies | October 2022 | Academic year of realisation of subject | | | 2022/2023 | | |
| 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 | 1 | Language of instruction | | | Polish | | |
| Semester of study | 2 | ECTS credits | | | 7.0 | | |
| Learning profile | general academic profile | Assessment form | | | exam | | |
| Conducting unit | Katedra Elektrotechniki -> Faculty of Electrical and Control Engineering | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr hab. inż. Jacek Horiszny | | | | |
| | Teachers | | dr hab. inż. Jacek Horiszny | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 30.0 | 30.0 | 15.0 | 0.0 | 0.0 | 75 |
| | 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 | 75 | | 13.0 | | 87.0 | 175 |
| Subject objectives | Defining basic concepts in electricity. Acquainting with the basic laws of electrics. Acquainting with the methods of analysis of electric circuits and the phenomena occurring in them. | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | |
| | [K6_W03] knows the basics of automation and automatic regulation, knows the principles of the selection of electrical devices, drive systems and their control | | solves simple linear DC circuits; solves simple linear 1-phase and 3-phase sinusoidal current circuits | | [SW3] Assessment of knowledge contained in written work and projects | | |
| | [K6_W05] has structured knowledge in the field of electrical engineering and electronics, necessary to understand the basics of operation and selection of electrical machines, electricity transmission systems and power electronic devices | | calculates parameters of equivalent circuits for elements of the power system | | [SW3] Assessment of knowledge contained in written work and projects | | |
| | [K6_K02] is able to work in a group taking different roles in it, can think and act in an entrepreneurial way, is aware of responsibility for their own work and responsibility for teamwork | | recognizes the potential exposures and hazards occurring in electrical systems | | [SK5] Assessment of ability to solve problems that arise in practice | | |
| Subject contents | Electric field intensity and electric potential, electric capacity, resistance of a conductor, magnetic field intensity and magnetic induction, inductance, electromagnetic induction. Linear DC circuits: electric circuit components, energy and power of electric current, Kirchhoffs laws, superposition, Thevenins theorem. Nonlinear DC circuits: linearity and nonlinearity of elements and circuits, methods of analysis, iterative methods, linearization, basics of semiconductor elements operation, basic electronic components, simple electronic circuits. AC circuits: ideal R, L, C components in the AC circuit, phasor solution, complex impedance, complex Kirchhoffs laws, phasor diagrams, active, reactive and complex power, complex Thevenin theorem, symmetrical 3-phase circuits, circuits with magnetic coupling, transformer. Transients in linear circuits: classical method of transient state analysis, transient and steady state components, initial conditions, circuits described by a differential equation of 1st and 2nd order. | | | | | | |
| Prerequisites and co-requisites | | | | | | | |

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| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | Written exam | 55.0% | 70.0% |
| | Tests during the semester | 55.0% | 30.0% |
| Recommended reading | Basic literature | Bolkowski S.: Elektrotechnika teoretyczna. Tom 1. Teoria obwodów elektrycznych. WNT, Warszawa 2001 Krakowski M.: Elektrotechnika teoretyczna. Tom 1. PWN, Warszawa 1999 | |
| | Supplementary literature | Cholewicki T.: Elektrotechnika teoretyczna. Tom 1 i 2. WNT, Warszawa 1972 | |
| | eResources addresses | Adresy na platformie eNauczanie: | |
| Example issues/ example questions/ tasks being completed | 1. Calculate the currents in DC circuit. 2. Calculate the currents in AC circuit. 3. Calculate the resonant frequency of circuit. 4. Calculate the resonant frequency of the circuit. 5. Calculate current and power in given symmetrical three-phase circuit with star-connected load. 6. Calculate current and power in given symmetrical three-phase circuit with delta-connected load. 7. Calculate current and power in given three-phase four-wire circuit with asymmetrical star-connected load. 8. Calculate current and power in given three-phase three-wire circuit with asymmetrical star-connected load. 9. Calculate current and power in given three-phase three-wire circuit with asymmetrical delta-connected load. | | |
| Work placement | Not applicable | | |

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