



Subject card

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|---|---|--|--|-------------------------------------|--|------------|-----|
| Subject name and code | Basics of Materials Engineering, PG_00003456 | | | | | | |
| Field of study | Automation, Robotics and Control Systems | | | | | | |
| Date of commencement of studies | October 2022 | | Academic year of realisation of subject | | 2024/2025 | | |
| Education level | first-cycle studies | | Subject group | | | | |
| Mode of study | Full-time studies | | Mode of delivery | | at the university | | |
| Year of study | 3 | | Language of instruction | | Polish | | |
| Semester of study | 6 | | ECTS credits | | 1.0 | | |
| Learning profile | general academic profile | | Assessment form | | assessment | | |
| Conducting unit | Department of Biomechatronics -> Faculty of Electrical and Control Engineering | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr hab. inż. Arkadiusz Żak | | | | |
| | Teachers | | dr hab. inż. Arkadiusz Żak | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 15.0 | 0.0 | 0.0 | 0.0 | 0.0 | 15 |
| | 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 | 15 | | 1.0 | | 9.0 | 25 |
| Subject objectives | During the course students get knowledge about materials used in electrical engineering, their properties and well as their production. | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | |
| | [K6_W02] has basic knowledge of physics including electrostatics, electromagnetism, electrodynamics, wave motion, acoustics, mechanics, thermodynamics, optics, solid state physics; including knowledge necessary to understand the basic physical phenomena occurring in devices of systems and systems of automation and robotics | | Recognises and selects electrotechnical materials by their properties and applications. | | [SW1] Assessment of factual knowledge | | |
| | [K6_U01] can obtain information from literature, databases and other sources; integrate the information obtained, interpret it and draw conclusions, formulate and justify opinions | | Acquires the necessary information and uses the knowledge gained to solve engineering problems relating to electrical engineering materials. | | [SU3] Assessment of ability to use knowledge gained from the subject | | |
| Subject contents | Lecture: Material engineering and material science. Physical basics of electrical conductivity. Copper and aluminum - comparison of properties. Contacts. Metallic and non-metallic resistive materials, criteria of selection. High temperature superconductors. Semiconductors in power electronics. Electronic materials. Magnetic materials: anisotropic, isotropic, amorphous, nanocrystalline magnetic materials. Hard magnetic materials. Mechanisms of conductivity and polarization of dielectrics. Organic and non-organic solids. Synthetic solids - physical and chemical basics. Thermoplastics, thermosets and elastomers. Liquid and gas insulating materials. | | | | | | |
| Prerequisites and co-requisites | | | | | | | |
| Assessment methods and criteria | Subject passing criteria | | Passing threshold | | Percentage of the final grade | | |
| | Mark from the final test | | 55.0% | | 100.0% | | |
| Recommended reading | Basic literature | | 1. Celiński Z.: Materiałoznawstwo elektrotechniczne. Warszawa: Oficyna Wyd. PW 2005. 2. Kolbiński K., Słowikowski J.: Materiałoznawstwo elektrotechniczne. Warszawa: WNT 1978. 3. Woynarowski Z., Sulikowski J., Augustyniak W.: Badanie materiałów elektrotechnicznych. Gdańsk, Wyd. PG, 1990 | | | | |

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| | Supplementary literature | based on the information available in the internet |
| | eResources addresses | Adresy na platformie eNauczanie: PODSTAWY INŻYNIERII MATERIAŁOWEJ [ARiSS][2024/25] - Moodle ID: 43362 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=43362 |
| Example issues/ example questions/ tasks being completed | 1. What are semiconductors? 2. What is the work principle of the p-n junction? 3. What are the sources of energy loss in dielectric materials? 4. How to properly select a dielectric/insulating material for selected applications? | |
| Work placement | Not applicable | |

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