



Subject card

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| Subject name and code | Structural Research of Materials, PG_00039768 | | | | | | |
| Field of study | Materials Engineering, Materials Engineering, Materials Engineering | | | | | | |
| Date of commencement of studies | October 2021 | | Academic year of realisation of subject | | 2022/2023 | | |
| Education level | first-cycle studies | | Subject group | | Optional subject group 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 | 2 | | Language of instruction | | Polish | | |
| Semester of study | 4 | | ECTS credits | | 3.0 | | |
| Learning profile | general academic profile | | Assessment form | | assessment | | |
| Conducting unit | | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | | | | | |
| | Teachers | | | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 15.0 | 0.0 | 15.0 | 0.0 | 0.0 | 30 |
| | 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 | 30 | | 5.0 | | 40.0 | 75 |
| Subject objectives | The purpose of the course is to familiarize students with methods of studying the microstructure of engineering construction materials, mainly by microscopic methods. | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | |
| | K6_W06 | | The student knows the structure of optical and electron microscopes and how to prepare material samples to determine their microstructure using various microscopes. | | [SW1] Assessment of factual knowledge | | |
| | K6_K01 | | The student understands the relationship between the microstructure of engineering materials and their properties and is aware of what methods can be used to determine the microstructure of materials. | | [SK5] Assessment of ability to solve problems that arise in practice | | |
| | K6_U01 | | The student is able to select an appropriate method of preparing a material sample so as to determine its microstructure. | | [SU4] Assessment of ability to use methods and tools | | |
| | K6_W04 | | The student knows the construction of optical and electron microscopes and how the microstructural structure of engineering materials can be determined with these tools. | | [SW1] Assessment of factual knowledge | | |
| | K6_U02 | | The student is able to use an optical microscope to select an appropriate method for studying the microstructure of engineering materials | | [SU5] Assessment of ability to present the results of task | | |
| Subject contents | Construction and principle of operation of an optical microscope and various electron microscopes. Resolution capacity, total and useful magnification of the microscope, objective aperture and how to select an eyepiece for selected objectives. Methods of obtaining contrast in light and electron microscopy. Preparation of specimens for examination on the light and electron microscope. | | | | | | |
| Prerequisites and co-requisites | brak | | | | | | |

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| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | passing all the laboratory classes | 60.0% | 50.0% |
| | exam | 60.0% | 50.0% |
| Recommended reading | Basic literature | Mikroskopia optyczna Maksymilian Pluta Transmission Electron Microscopy: A Textbook for Materials Science: by C. Barry Carter David B. Williams Scanning Electron Microscopy and X-Ray Microanalysis. A Text for Biologists, Materials Scientists, and Geologists: Goldstein, J., Newbury, D.E., Echlin, P., Joy, D.C., Romig Jr., A.D., Lyman, C.E., Fiori, C., Lifshin, E. Imaging Optics. Joseph Braat, Peter Török | |
| | Supplementary literature | Introduction to Optical Microscopy. Jerome Mertz | |
| | eResources addresses | Adresy na platformie eNauczanie: | |
| | Example issues/ example questions/ tasks being completed | Draw a diagram of an optical microscope | |
| List the methods of obtaining contrast on an optical microscope | | | |
| List the steps in making extraction films | | | |
| Work placement | Not applicable | | |