



## Subject card

|   |   |  |                                     |  |  |         |     |
|---|---|--|-------------------------------------|--|--|---------|-----|
| Subject name and code                       | Computer Aided Design and Selection of Materials, PG_00055501   |  |                                     |  |  |         |     |
| Field of study                              | Mechanical Engineering  |  |                                     |  |  |         |     |
| Date of commencement of studies             | October 2023  | Academic year of realisation of subject                  |                                     |  | 2025/2026  |         |     |
| Education level                             | first-cycle studies   | Subject group  |                                     |  | Optional subject group<br>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                               | 3   | Language of instruction                                  |                                     |  | Polish   |         |     |
| Semester of study                           | 6   | ECTS credits   |                                     |  | 4.0  |         |     |
| Learning profile                            | general academic profile  | Assessment form  |                                     |  | assessment   |         |     |
| Conducting unit                             | Zakład Materiałoznawstwa i Technologii Materiałowych -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology  |  |                                     |  |  |         |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor  | dr inż. Krzysztof Krzysztofowicz                         |                                     |  |  |         |     |
|   | Teachers  |  |                                     |  |  |         |     |
| Lesson types and methods of instruction     | Lesson type   | Lecture  | Tutorial                            | Laboratory   | Project  | Seminar | SUM |
|   | Number of study hours   | 30.0   | 0.0                                 | 15.0   | 15.0   | 0.0     | 60  |
|   | 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   | 60   | 4.0                                 |  | 36.0   | 100     |     |
| Subject objectives                          | Combining knowledge from basic subjects with their practical use in the design and selection process materials, taking into account the functions performed; required characteristics of the material needed for implementation product. Obtaining the ability to critically analyze (validate) the design and selection of materials and choose the best optimal solution under precisely defined conditions.  |  |                                     |  |  |         |     |
| Learning outcomes                           | Course outcome  | Subject outcome  |                                     | Method of verification   |  |         |     |
|   | [K6_U10] is able to formulate the principles of selecting a material for a construction, ensuring the correct operation of a device   | Is able to formulate the rules of selection material     |                                     | [SU1] Assessment of task fulfilment                                  |  |         |     |
|   | [K6_W03] possesses and is able to practically apply the knowledge on the construction, properties and testing methods of construction materials   | Knows materials properties and research methods          |                                     | [SW3] Assessment of knowledge contained in written work and projects |  |         |     |
| Subject contents                            | <p>Lecture General principles of material design. The role of material design in the engineering design of products and their production processes. Elements and phases of engineering design. Principles of material selection - basic properties of individual groups of materials. Functional, sociological, ecological and economic factors in selection of materials. Ecological aspects of choosing a material solution. Software for analysis and selection of materials using various criteria. Selection support systems and material databases. Selection examples.</p> <p>Project</p> <p>Examples of selection due to mechanical properties, thermal properties and corrosion resistance. Selection analysis from taking into account the external and internal shape of the material. Independent solving assigned design tasks. Lab</p> <p>Practical knowledge of materials testing methods. Basics of using ANSYS Granta software</p> |  |                                     |  |  |         |     |
| Prerequisites and co-requisites             |   |  |                                     |  |  |         |     |

| Assessment methods and criteria                                | Subject passing criteria   | Passing threshold  | Percentage of the final grade |
|--|--|--|-------------------------------|
|  | Lecture -colloquium  | 50.0%  | 40.0%                         |
|  | Project  | 50.0%  | 30.0%                         |
|  | Laboratory   | 50.0%  | 30.0%                         |
| Recommended reading  | Basic literature   | 1. Ashby M.F., Shercliff H., Cebon D.: Inżynieria materiałowa, tom 1 i 2, wyd. Galaktyka 2011<br>2. Ashby M.F.: Dobór materiałów w projektowaniu inżynierskim. WNT. Warszawa 1998<br>3. Ashby M.F., Jones D.R.H. Materiały inżynierskie - Właściwości i zastosowania - tom 1. WNT, Warszawa 1996<br>4. Ashby M.F., Jones D.R.H. Materiały inżynierskie - Kształtowanie struktury i właściwości materiałów - tom 2. WNT, Warszawa 1998<br>5. Dobrzański L.A.: Materiały inżynierskie i projektowanie materiałowe: podstawy nauki o materiałach i metaloznawstwo. WNT. Warszawa 2006<br>6. Blicharski M. : Wstęp do inżynierii materiałowej. Wyd. II, WNT, Warszawa 1998 |                               |
|  | Supplementary literature   | 1. Blicharski M.: Inżynieria materiałowa. Stal. WNT, Warszawa 2004.<br>2. Ciszewski B., Przetakiewicz W.: Nowoczesne materiały w technice. Wyd. Bellona, W-wa 1993.<br>3. Dobrzański L.A.: Podstawami nauki o materiałach i metaloznawstwo. WNT, Gliwice - Warszawa 2002.<br>4. Dobrzański L.A.: Metaloznawstwo z podstawami nauki o materiałach. WNT Warszawa 1996.<br>5. Dobrzański L.A.: Metalowe materiały inżynierskie. WNT Warszawa 2004.  |                               |
|  | eResources addresses   | Adresy na platformie eNauczanie:   |                               |
| Example issues/<br>example questions/<br>tasks being completed | <p>Comparison of material properties according to the indicated criteria</p> <p>Preparation of the design of the device, including the selection of material, assessment of its environmental friendliness and estimation of manufacturing costs</p> <p>What are the criteria for selecting materials</p> <p>What features of materials do we take into account in design?</p> |  |                               |
| Work placement   | Not applicable   |  |                               |