GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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|---|---|---|---|
| Subject name and code | Surface Machining Technology, PG_00055509 | | |
| 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 | 2.0 |
| Learning profile | general academic profile | Assessment form | assessment |
| Conducting unit | Department of Materials Engineering and Bonding -> Faculty of Mechanical Engineering and Ship Technology | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr inż. Beata Majkowska-Marzec | |
| | 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 | 2.0 | 18.0 | 50 |

**Subject objectives**

The aim of the course is to familiarize students with technologies of manufacturing of surface layers and protective coatings and assessment of selected properties of the modified surface.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [K6_U09] is able to plan the manufacturing, assembly and quality control processes of typical constructions and mechanical devices, estimating their costs | The student is able to choose the production method and the type of protective coating or top layer in the context of the protection of the structure against external or operational factors. | [SU4] Assessment of ability to use methods and tools |
| [K6_W03] possesses and is able to practically apply the knowledge on the construction, properties and testing methods of construction materials | The student knows the most important trends in material engineering and is able to connect the acquired knowledge in the field of surface engineering with other fields of engineering knowledge. | [SW1] Assessment of factual knowledge |

**Subject contents**

LECTURE Methods and techniques of forming surface layers. Chemical and electrolytic forming methods of the metallic coatings. Chosen production technology of the steel saturation by metallic and non-metallic elements. Creating of the coatings from gaseous phase and their applocation. Forming the surface layers by the laser, CVD, PVD and PLD treatments. LABORATORY Coatings fabricated by electrochemical method. Production technology of the immersed and sprayed coatings. Coatings created by thermo-chemical treatment. Advanced the surface layers.

**Prerequisites and co-requisites**

Knowledge of the subject: Fundamentals of Materials Engineering I and II

**Assessment methods and criteria**

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| Practical exercise | 56.0% | 40.0% |
| Written exam | 56.0% | 60.0% |

**Recommended reading**

Basic literature

1. Burakowski T., Wierzchoń T.: Inżynieria powierzchni metali. WNT Warszawa 1995. 2. Praca zbiorowa pod redakcją Stanisława Tkaczyka.: Powłoki ochronne. Gliwice 1994. 3. Kula P.: Inżynieria warstwy wierzchniej. Wyd. Politechniki Łódzkiej, Łódź 2000. 4. Kusiński J.: Lasery i ich zastosowanie w inżynierii materiałowej. Kraków, Wyd. Naukowe Akapit 2000. 5. Klimpel A.: Napawanie i natryskiwanie cieplne. Technologie. WNT Warszawa 2000.

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|---|---|---|
| | Supplementary literature | 1. Dobrzański L.A.: Podstawy nauki o materiałach i metaloznawstwo. Materiały inżynierskie i podstawy projektowania materiałowego. WNT. 2002. |
| | eResources addresses | Adresy na platformie eNauczanie: |
| Example issues/ example questions/ tasks being completed | 1. What is the difference between the protective coating and the top layer?<br><br>2. List the steps in the thermal spray process. | |
| Work placement | Not applicable | |