GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

| | | | |
|---|---|---|---|
| Subject name and code | Tribology, PG_00064927 | | |
| Field of study | Mechanical Engineering | | |
| Date of commencement of studies | February 2027 | Academic year of realisation of subject | 2027/2028 |
| Education level | second-cycle studies | Subject group | Specialty subject group<br>Subject group related to scientific research in the field of study |
| Mode of study | Part-time studies | Mode of delivery | at the university |
| Year of study | 1 | Language of instruction | Polish |
| Semester of study | 2 | ECTS credits | 4.0 |
| Learning profile | general academic profile | Assessment form | exam |
| Conducting unit | Division of Machine Design and Medical Engineering -> Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | prof. dr hab. inż. Michał Wasilczuk | |
| | Teachers | | |

**Lesson types**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 18.0 | 0.0 | 18.0 | 0.0 | 0.0 | 36 |

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 | 36 | 6.0 | 58.0 | 100 |

**Subject objectives**

teaching about tribology - science of friction wear and lubrication. Showing examples dealing with advanced bearing systems

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [K7_W12] identifies and interprets the main developmental trends and significant new achievements in the field of engineering and technical sciences and disciplines relevant to the course of study | The student is aware of and able to demonstrate knowledge regarding the civilizational challenges associated with the design and operation of machinery—specifically energy conservation, emission reduction, and the reduction of petroleum-based lubricant consumption. | [SW1] Assessment of factual knowledge |
| [K7_U01] utilizes information obtained from the literature and other sources in the field of Mechanics and Mechanical Engineering and presents and analyses the results of solutions to technical problems in this field | The student knows and is able to apply knowledge regarding friction, wear, and lubrication. | [SU3] Assessment of ability to use knowledge gained from the subject |
| [K7_U03] plans and carries out experimental investigations to determine the parameters of devices, processes or systems in the field of Mechanical Engineering and Mechanical Engineering, appropriately selects methods, techniques and tools, interprets results and estimates measurement errors | The student is able to apply their knowledge to plan experiments in the fields of tribology and bearing engineering. | [SU4] Assessment of ability to use methods and tools |
| [K7_W01] explains and describes, on the basis of general knowledge of the scientific disciplines forming the theoretical basis of Mechanics and Mechanical Engineering, the structure and principles of operation of mechanical systems and processes | The student is familiar with the design principles of advanced bearing systems | [SW1] Assessment of factual knowledge |

<table>
<tr><td>Subject contents</td><td>Course content – lecture<br>Friction, wear, and lubrication – fundamentals<br><br>Wear mechanisms<br><br>Radial and thrust bearings – development challenges<br><br>Environmental aspects of bearing systems – use of unconventional materials and eco-friendly lubricants<br><br>Course content – laboratory<br>Dry friction, particle emission, tribological experiments<br><br>Testing of thrust bearings<br><br>Bearing calculations according to standards<br><br>Rolling-element bearing diagnostics<br><br>Analysis of experimental data</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>written exam</td><td>50.0%</td><td>50.0%</td></tr>
<tr><td>Laboratory</td><td>100.0%</td><td>50.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>FT Barwell - Bearing System<br><br>D. Dowson - History of Tribology</td></tr>
<tr><td>Supplementary literature</td><td>Papers on tribology and bearing systems in scientific journals (Tribology International, Tribology Transactions, Wear, Lubrication Science, Lubricants)</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>Identify methods for compensating for thermal deformation in large-scale thrust bearings.<br>Challenges associated with implementing water lubrication in sliding bearings.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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