



## Subject card

|   |  |  |   |                                     |  |            |     |
|---|--|--|---|-------------------------------------|--|------------|-----|
| Subject name and code                       | Mechanics, PG_00038429   |  |   |                                     |  |            |     |
| Field of study                              | Electrical Engineering   |  |   |                                     |  |            |     |
| Date of commencement of studies             | October 2022   |  | Academic year of realisation of subject |                                     | 2022/2023  |            |     |
| Education level                             | first-cycle studies  |  | Subject group                           |                                     | Obligatory subject group in the field of study<br>Subject group related to scientific research in the field of study |            |     |
| Mode of study                               | Full-time studies  |  | Mode of delivery                        |                                     | blended-learning   |            |     |
| Year of study                               | 1  |  | Language of instruction                 |                                     | Polish   |            |     |
| Semester of study                           | 1  |  | ECTS credits                            |                                     | 3.0  |            |     |
| Learning profile                            | general academic profile   |  | Assessment form                         |                                     | assessment   |            |     |
| Conducting unit                             | Department of Mechatronics and High Voltage Engineering -> Faculty of Electrical and Control Engineering   |  |   |                                     |  |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor   |  | dr inż. Łukasz Doliński                 |                                     |  |            |     |
|   | Teachers   |  | dr inż. Łukasz Doliński                 |                                     |  |            |     |
| Lesson types and methods of instruction     | Lesson type  | Lecture  | Tutorial                                | Laboratory                          | Project  | Seminar    | SUM |
|   | Number of study hours  | 30.0   | 15.0                                    | 0.0                                 | 0.0  | 0.0        | 45  |
|   | E-learning hours included: 30.0  |  |   |                                     |  |            |     |
| 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  | 45   |   | 4.0                                 |  | 26.0       | 75  |
| Subject objectives                          | Obtaining of basic knowledge form mechanic and strength of materials   |  |   |                                     |  |            |     |
| Learning outcomes                           | Course outcome   |  | Subject outcome                         |                                     | Method of verification   |            |     |
|   | K6_K01   |  |   |                                     | [SK5] Assessment of ability to solve problems that arise in practice   |            |     |
|   | K6_U02   |  |   |                                     | [SU4] Assessment of ability to use methods and tools   |            |     |
|   | K6_W02   |  |   |                                     | [SW1] Assessment of factual knowledge  |            |     |
| Subject contents                            | Basic concepts. The axioms of statics. Original concepts: force as a vector, zero two, the theorem on moving the vector along the acting line, resultant of two non-parallel forces in the plane, decomposition of force to the two components of given directions. The principle of action and reaction, types of bonds, equilibrium of convergent set of forces, different sets of forces. Analytical representation of force. Main vector. Conditions of equilibrium of convergent flat and spatial set of forces. Three forces theorem. A pair of forces. Moment of pair of forces. Concatenation of two parallel forces. Pair of forces theorem. Concatenation of pair of forces in one plane. Moment of force with respect to the point and axis. Moment of a force with respect to the point (pole) and axis. Parallel moving forces theorem. Equilibrium of free, planar and spatial set of forces. Reduction of planar and spatial set of forces – typical cases. Condition of equilibrium of planar and spatial set of forces. Centre of gravity. Centre of parallel forces. Centre of gravity of solids, plane figures and lines. Friction, static friction, the force of static friction, kinetic friction, string friction, rolling friction. Basic assumptions and hypotheses of the strength of materials, types of loads, deformations and stresses. Elements of elasticity theory. Loads classification. The de Saint-Venant principle. Fundamentals of designing structures. Moments of inertia of planar figures. Tension and compression of straight bars. Technological Shear. Torsion of rods. Bending. Strength. Bending with tension or compression. Bending and torsion. Fatigue strength. Basic concepts of fatigue strength, fatigue strength the cycles of symmetrical and asymmetrical. Factors influencing the change of fatigue strength. |  |   |                                     |  |            |     |
| Prerequisites and co-requisites             | Knowledge of algebra on secondary school level   |  |   |                                     |  |            |     |
| Assessment methods and criteria             | Subject passing criteria   |  | Passing threshold                       |                                     | Percentage of the final grade  |            |     |
|   | Midterm colloquium   |  | 50.0%                                   |                                     | 50.0%  |            |     |
|   | Class tests  |  | 50.0%                                   |                                     | 50.0%  |            |     |

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| Recommended reading  | Basic literature   | <ol style="list-style-type: none"> <li>1. Krawczuk M.: Mechanika ciała stałego – wybrane zagadnienia. Wydawnictwo PG, Gdańsk, 2005.</li> <li>2. Niezgodziński T.: Mechaniak ogólna. WNT, Warszawa, 2008.</li> <li>3. Misiak J.: Mechanika techniczna. Statyka i wytrzymałość materiałów. WNT, Warszawa, 2006.</li> </ol> |
|  | Supplementary literature   | <ol style="list-style-type: none"> <li>1. Bąk.R.,Stawinoga.A.: Mechanika dla niemechaników. WNT, Warszawa 2009.</li> <li>2. Niezgodziński M.E., Niezgodziński T.: Wytrzymałość materiałów. WNT, Warszawa, 2010.</li> <li>3. Osiński Z.: Mechanika ogólna. PWN, Warszawa, 1994.</li> </ol>                                |
|  | eResources addresses   | Adresy na platformie eNauczanie:<br>MECHANIKA [ETJ][2022/23] - Moodle ID: 24916<br><a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=24916">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=24916</a>   |
| Example issues/<br>example questions/<br>tasks being completed | Rigid body<br><br>Force systems<br><br>Strains/stresses<br><br>Constitutive equation<br><br>Torsion bending<br><br>Fatigue strengtgh |  |
| Work placement   | Not applicable   |  |