

| <b>STUDY MODULE DESCRIPTION FORM</b>   |   |  |
|--|---|--|
| Name of the module/subject<br><b>Applied Mechanics</b>   |   | Code<br><b>1010622311010642213</b>   |
| Field of study<br><b>Transport</b>   | Profile of study (general academic, practical)<br><b>(brak)</b> | Year /Semester<br><b>1 / 1</b>   |
| Elective path/specialty<br><b>Ecology of Transport</b>   | Subject offered in:<br><b>Polish</b>                            | Course (compulsory, elective)<br><b>obligatory</b>   |
| Cycle of study:<br><b>Second-cycle studies</b>   | Form of study (full-time, part-time)<br><b>full-time</b>        |  |
| No. of hours<br>Lecture: <b>1</b> Classes: <b>1</b> Laboratory: <b>-</b> Project/seminars: <b>-</b>  |   | No. of credits<br><b>2</b>   |
| Status of the course in the study program (Basic, major, other)<br><b>(brak)</b>   |   | (university-wide, from another field)<br><b>(brak)</b>   |
| Education areas and fields of science and art<br><b>technical sciences</b><br><b>Technical sciences</b>  |   | ECTS distribution (number and %)<br><b>2 100%</b><br><b>2 100%</b>   |
| <b>Responsible for subject / lecturer:</b><br>dr inż. Berdychowski Maciej<br>email: maciej.berdychowski@put.poznan.pl<br>tel. 612244512<br>Faculty of Transport Engineering<br>ul. Piotrowo 3 60-965 Poznań    |   | <b>Responsible for subject / lecturer:</b><br>dr inż. Bartosz Wieczorek<br>email: bartosz.wieczorek@put.poznan.pl<br>tel. 61 665 20 42<br>Faculty of Transport Engineering<br>ul. Piotrowo 3 60-965 Poznań |
| <b>Prerequisites in terms of knowledge, skills and social competencies:</b>  |   |  |
| 1  | <b>Knowledge</b>  | Student has a fundamental knowledge of higher mathematics, physics, theoretical and applied mechanics, strength of materials and base of machines design   |
| 2  | <b>Skills</b>   | Student has abilities to solve analytical problems, can apply knowledge in practical applications of mechanical engineering  |
| 3  | <b>Social competencies</b>                                      | Student has abilities of a group work, can logically and analytically think during solving problems. Student has abilities to take rational decisions  |
| <b>Assumptions and objectives of the course:</b><br>Transmitting to the students the knowledge of technical problems solving on the base of mechanic laws  |   |  |
| <b>Study outcomes and reference to the educational results for a field of study</b>  |   |  |
| <b>Knowledge:</b>  |   |  |
| 1. Has a basic knowledge of the mechanics of solids and discrete systems with many degrees of freedom, mathematical modelling of physical and mechanical systems based on the principle of d - [K2A_W02]       |   |  |
| 2. Has an extended knowledge of modern construction materials such as plastics, carbon composites, ceramics, in terms of their construction, processing technology and applications - [K2A_W10]                |   |  |
| 3. Has an extended knowledge in selected areas of technical mechanics related to the chosen specialization (e.g. soil mechanics). - [K2A_W16]  |   |  |
| 4. Has an in-depth knowledge of the design and principles of operation and grading machines from the equipment of the chosen group - [K2A_W18]   |   |  |
| <b>Skills:</b>   |   |  |
| 1. . Is able to use a common numerical computations system for programming a simple simulation task with limited degrees of freedom - [K1A_U07]  |   |  |
| <b>Social competencies:</b>  |   |  |
| 1. Understands the need for lifelong learning; is able to inspire and organize the learning process of others. - [K2A_K01]   |   |  |
| 2. Is aware of and understands the importance and impact of non-technical aspects of mechanical engineering activities and its impact on the environment, is aware of responsibility for decisions - [K2A_K02] |   |  |
| 3. Is able to set priorities for realization of undertaken tasks. - [K2A_K04]  |   |  |

| <b>Assessment methods of study outcomes</b>   |                             |             |
|---|-----------------------------|-------------|
| -Examination  |                             |             |
| <b>Course description</b>   |                             |             |
| -Basics of analytic mechanics, constraints in analytic mechanics and their classification. Moment of inertia tensor, equations of motion, Lagrange's equations. Vibration theory elements, linear systems equations. Dynamic systems analysis and synthesis. Kinematics and dynamics of spherical motion and complex motion, Coriolis forces, gyroscope |                             |             |
| <b>Basic bibliography:</b>  |                             |             |
| 1. W. Derski; Mechanika techniczna cz. I, Wydawnictwo PP, Poznań 1972   |                             |             |
| 2. J. Leyko; Mechanika ogólna, PWN, Warszawa 1997   |                             |             |
| 3. J. Misiak; Mechanika techniczna, WNT, Warszawa 1998  |                             |             |
| 4. Z. Osiński; Mechanika ogólna, PWN, Warszawa 1997   |                             |             |
| <b>Additional bibliography:</b>   |                             |             |
| 1. R. Scanlan, R. Rosenbaum; Drgania i flatter samolotów, PWN, Warszawa 1964  |                             |             |
| 2. M. Sperski; Mechanika, Wydawnictwo PG, Gdańsk 2002   |                             |             |
| <b>Result of average student's workload</b>   |                             |             |
| <b>Activity</b>   | <b>Time (working hours)</b> |             |
| 1. Lectures   | 15                          |             |
| 2. Strengthening the lecture  | 8                           |             |
| 3. Consultations  | 5                           |             |
| 4. Preparation to pass the exam   | 5                           |             |
| 5. Participation in the exam  | 2                           |             |
| 6. Participation in the exercises   | 15                          |             |
| 7. Preparation to the exercises   | 5                           |             |
| 8. Consultations exercise content   | 2                           |             |
| 9. Preparing to pass the exercises  | 2                           |             |
| 10. Participation in the test   | 2                           |             |
| <b>Student's workload</b>   |                             |             |
| <b>Source of workload</b>   | <b>hours</b>                | <b>ECTS</b> |
| Total workload  | 58                          | 2           |
| Contact hours   | 38                          | 2           |
| Practical activities  | 0                           | 0           |