

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Modelling of Physical Systems		Code 1010615311010642212
Field of study Transport	Profile of study (general academic, practical) (brak)	Year /Semester 1 / 1
Elective path/specialty Logistics of Transport	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) part-time	
No. of hours Lecture: 9 Classes: 9 Laboratory: - Project/seminars: -		No. of credits 2
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 2 100% 2 100%
Responsible for subject / lecturer: dr inż. Berdychowski Maciej email: maciej.berdychowski@put.poznan.pl tel. 612244512 Faculty of Transport Engineering ul. Piotrowo 3 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge of mathematics, materials science, mechanics, basics of machine design, theory of machines and strength of materials acquired during the first degree studies.
2	Skills	Basics of vector and tensor analysis, solve simple problems of strength, the ability to solve differential equations.
3	Social competencies	Students are creative and consistent in the implementation of the tasks has autonomy to solve problems, acquire and improve their knowledge and skills.
Assumptions and objectives of the course: Learning a new mathematical apparatus necessary in the process of modeling materials and machines (mechanisms), learn the basics of physical and mathematical modeling of construction materials, machinery and equipment, some physical processes.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Has a basic knowledge of the mechanics of solids and discrete systems with many degrees of freedom. - [K2A_W02]		
2. Mathematical modeling of physical and mechanical systems based on the principle of d'Alembert - [K2A_W02]		
Skills:		
1. Can use the assimilated knowledge of the mechanics of construction materials for the simulation of mechanical systems, mechanisms and machines. - [K2A_U05]		
2. Is able to use acquired mathematical theories to create and analyze simple models - [K2A_U14]		
Social competencies:		
1. Understands the need and knows the possibilities of lifelong learning, knows the need for acquiring new knowledge for professional development. - [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 and responsibility for own decisions in short and long-term aspect. - [K2A_K02]		
3. Is able to act in a professional manner, comply with the rules of professional ethics and respect for cultural diversity. - [K2A_K03]		
4. Has a sense of responsibility for one's own work and is willing to comply with the principles of teamwork and taking responsibility for collaborative tasks - [K2A_K04]		

Assessment methods of study outcomes		
Written exam		
Course description		
<p>Notes on modeling - a goal of modeling. The modeling process - stages of modeling scheme. Physical modeling simplifying assumptions physical quantities, examples of physical models. Mathematical modeling of the base model, tensors , coordinate systems, principles for the formulation of constitutive compounds</p> <p>Solving the equations of motion of mechanical systems. Mathematical models of construction materials one-parameter models, complex models, some models nonclassical. Mechanical systems one and two-parameter equation of motion, undamped and damped oscillations, resonance, self-excited oscillations, vibrations of beams and shafts. Mathematical models of selected processes thermal systems, hydrodynamic systems. The analogy between the worlds of physical.</p>		
Basic bibliography:		
<ol style="list-style-type: none"> Ostrowska-Maciejewska; Podstawy mechaniki ośrodków ciągłych, PWN, Warszawa 1982 W. Flügge; Tensor analysis and continuum mechanics, Springer-Verlag, Berlin 1972 R. H. Cannon jr.; Dynamika układów fizycznych, WNT, Warszawa 1973 		
Additional bibliography:		
<ol style="list-style-type: none"> Z. Parszewski; Drgania i dynamika maszyn, WNT, Warszawa 1982 W. Tarnowski; Modelowanie systemów, Wyd. Politechniki Koszalińskiej, Koszalin 2004 R. Scanlan, R. Rosenbaum; Drgania i flatter samolotów, PWN, Warszawa 1964 		
Result of average student's workload		
Activity	Time (working hours)	
1. Lectures	9	
2. Strengthening the lecture	8	
3. Consultations	2	
4. Preparation to pass the exam	5	
5. Participation in the exam	2	
6. Participation in the exercises	9	
7. Consolidation of the exercises	9	
8. Consultations	2	
9. Preparation for the test	8	
10. Test	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	58	2
Contact hours	26	1
Practical activities	0	0