

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Analytical Mechanics		Code 1010642111010642332
Field of study Mechanical Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 1 / 1
Elective path/specialty Mechatronics	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 1 Classes: 1 Laboratory: - Project/seminars: -		No. of credits 3
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		ECTS distribution (number and %) 3 100%
Responsible for subject / lecturer: dr inż. Maciej OBST email: maciej.obst@put.poznan.pl tel. 61 665 20 42 Working Machines and Transportation Piotrowo 3		Responsible for subject / lecturer: prof. dr hab. inż. Janusz MIELNICZUK email: janusz.mielniczuk@put.poznan.pl tel. 61 665 23 35 Working Machines and Transportation Piotrowo 3
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Student has a fundamental knowledge of higher mathematics, physics, theoretical and applied mechanics, strength of materials and base of machines design
2	Skills	Student has abilities to solve analytical problems, can apply knowledge in practical applications of mechanical engineering
3	Social competencies	Student has abilities of a group work, can logically and analytically think during solving the problems. Student has abilities to take rational decisions
Assumptions and objectives of the course:		
1. Transmitting to the students the knowledge of analytic mechanics which is connected with the faculty of study and educational programme requirements. 2. Development of students skills in: - analytical thinking, association and awareness of apply analytical methods, - physical phenomena modelling and its application in technique, - application of computational methods during modelling in mechanics, - independent inferring and analyzing problem estimation, 3. Students group work developing.		
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, 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]		
Skills:		
1. Is able to use a common numerical computations system for programming a simple simulation task with limited degrees of freedom. - [K1A_U03]		
Social competencies:		

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]

Assessment methods of study outcomes		
Examination		
Course description		
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. Rotations compose.		
Basic bibliography:		
<ol style="list-style-type: none"> 1. W. Derski; Mechanika techniczna cz. I, Wydawnictwo PP, Poznań 1972 2. R. Gutowski; Mechanika analityczna, PWN 1971 3. J. Leyko; Mechanika ogólna, PWN, Warszawa 1997 4. J. Misiak; Mechanika techniczna, WNT, Warszawa 1998 5. Z. Osiński; Mechanika ogólna, PWN, Warszawa 1997 6. R. Scanlan, R. Rosenbaum; Drgania i flatter samolotów, PWN, Warszawa 1964 7. M. Sperski; Mechanika, Wydawnictwo PG, Gdańsk 2002 8. E.Wittbrodt ; Mechanika Ogólna, teoria i zadania, Wydawnictwo PG, Gdańsk 2012 		
Additional bibliography:		
<ol style="list-style-type: none"> 1. R.H. Cannon jr. Dynamika układów fizycznych, WNT 1973 		
Result of average student's workload		
Activity	Time (working hours)	
1. Lectures	15	
2. Consultations	2	
3. Preparation to pass the exam	12	
4. Participation in the exam	2	
5. Participation in the exercises	15	
6. Preparation to the exercises	15	
7. Preparing to pass the exercises	12	
8. Preparation in the test	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	77	3
Contact hours	38	3
Practical activities	0	0