STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Analytical Mechanics**		Code **1010601111010642332**
Field of study **Mechanical Engineering**	Profile of study (general academic, practical) **(brak)**	Year /Semester **1 / 1**
Elective path/specialty **Aircraft Engines**	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				No. of credits **3**
Lecture: **1**	Classes: **1**	Laboratory: **-**	Project/seminars: **-**	

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	ECTS distribution (number and %**)**

Responsible for subject / lecturer:

dr inż. Maciej OBST
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tel. 61 665 20 42
Working Machines and Transportation
Piotrowo 3

Responsible for subject / lecturer:

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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:

Additional bibliography:

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