

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Airplanes, helicopters, rockets		Code 1010601161010637745
Field of study Aerospace Engineering	Profile of study (general academic, practical) general academic	Year /Semester 3 / 6
Elective path/specialty Aircraft Engines and Airframes	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 1 Classes: - Laboratory: - Project/seminars: 2		No. of credits 3
Status of the course in the study program (Basic, major, other) other		(university-wide, from another field) university-wide
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 3 100% 3 100%
Responsible for subject / lecturer: dr inż. Jędrzej Mosiężny email: jedrzej.mosiezny@put.poznan.pl tel. 61 665 2212 Faculty of Transport Engineering ul. Piotrowo 3 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge on aircrafts, helicopters and rockets.
2	Skills	Being capable of performing basic engineering calculations
3	Social competencies	Is competent to ask proper questions, knows limitations of own knowledge and understands the necessity of continuous learning
Assumptions and objectives of the course: Student gains knowledge on design and construction of aircraft, rockets and helicopters		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Has detailed knowledge on manned and unmanned airframe desing, including instruments and main components of the airframe - [K1A_W13]		
2. Has basic knowledge on basisc of machine design and theory of machines and mechanisms - [K1A_W05]		
3. Has grounded knowledge on engineering graphics, use of Computer Aided Design in machine construction - [K1A_W07]		
Skills:		
1. Is capable of verbal communication in polish and foreing language in at least B2 level - [K1A_U07]		
2. Is capable communicating with use of different techniques in professional environments with use of formal construction definition methods, vocabulary and definitions consistent with studies. - [K1A_U02]		
3. Is capable of gaining information from literature, internet, databses and other sources. Is capable of integrating gained knowledge, formulate and defend conclusions. - [K1A_U04]		
Social competencies:		
1. Is capable of creative and enterprise thining - [K1A_K06]		
2. Is aware of importance and understands nontechnical aspects and effects of engineering work including environmental impact and related responsibility in decision making - [K1A_K02]		
3. Is aware of responsibility of own work and readiness to submit to rules of cooperation in team and taking responsibility for cooperative projects - [K1A_K04]		

Assessment methods of study outcomes		
Written exam, project assignment		
Course description		
Trend and cost analysis, mission profile, initial weight assignment, engine type assignments, airframe load analysis, 0-D rocket engine calculations, basics of helicopter flight dynamics		
Basic bibliography:		
1. Andreson, Jr.? Introduction to Flight, McGraw-Hill, 2004		
2. Raymer, Aircraft Design		
3. Mattingly J.D. ? Elements of propulsion: Gas Turbine and Rockets, AIAA		
Additional bibliography:		
Result of average student's workload		
Activity	Time (working hours)	
1. Exam preparation	10	
2. Exam	2	
3. Lectures	15	
4. Projects/Seminars	30	
5. Project preparation	25	
Student's workload		
Source of workload	hours	ECTS
Total workload	82	3
Contact hours	47	1
Practical activities	55	2