STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Structure mof Powertrains**		Code **1010601141010633792**
Field of study **Aerospace Engineering**	Profile of study (general academic, practical) **(brak)**	Year /Semester **2 / 4**
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: **1** Laboratory: **1** Project/seminars: **-**		No. of credits **4**
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 %) **4 100%** **4 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge of mechanics, metrology, strength of materials and thermodynamics.
2	**Skills**	Can apply the scientific method in problem solving, experiments implementation and inference
3	**Social competencies**	He knows the limits of his knowledge and skills; can precisely formulate questions, understands the need for further education

Assumptions and objectives of the course:

- Familiarizing students with issues related to the requirements, construction and operation of automatic control systems for aviation teams for turbine engines and examples of control systems implementation.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. has basic knowledge of electric drives in machines, including three-phase current, DC and AC motors, frequency and voltage converters, and power electronics. as well as automation systems, microcontrollers, control algorithms, machines and industrial robots, electronic navigation systems used in machines and communication systems - [K1A_W05]

2. has a structured, theoretically founded general knowledge covering key issues in the field of technical thermodynamics, i.e. the theory of thermodynamic transformations, heat transfer, thermal and cooling machines - [K1A_W10]

Skills:

1. knows how to use native and international languages to the extent that it allows to understand technical texts and write technical descriptions of machines in the field of aviation and astronautics (technical terminology) - [K1A_U01]

2. can obtain information from literature, the Internet, databases and other sources. Can integrate the information obtained and interpret conclusions and create and justify opinions - [K1A_U04]

3. is able to develop a safety instruction for a simple and medium-complex on-board device, machine or technical flying facility under specified environmental conditions - [K1A_U12]

Social competencies:

1. understands the need to learn throughout life; can inspire and organize the learning process of other people - [K1A_K01]

2. is aware of the importance and understands the non-technical aspects and effects of engineering activities, including its impact on the environment, and the related responsibility for decisions - [K1A_K02]

3. can think and act in an entrepreneurial way - [K1A_K06]

Assessment methods of study outcomes
-Written exam - Oral calculation
Course description
- Turbine engines as control objects. Requirements for automatic control systems for turbine engines. Application of simulation methods for the synthesis of control systems. Examples of practical implementation of control systems of modern turbine engines. Operation of aircraft powered by turbine and reciprocating engines according to the standards specified in the requirements of JAR66 aviation regulations.
Basic bibliography:
Additional bibliography:

Result of average student's workload

Activity	**Time (working hours)**
1. Przygotowanie do egzaminu	20
2. Udział w egzaminie	2
3. Przygotowanie do zaliczenia ćwiczeń	12
4. Przygotowanie do zajęć laboratoryjnych	14
5. Wykonanie sprawozdań z zajęć laboratoryjnych	6
6. Udział w zajęciach laboratoryjnych	15
7. Udział w zajęciach wykładowych	30
8. Udział w zajęciach ćwiczeniowych	30
9. Udział w zaliczeniu	4

Student's workload

Source of workload	**hours**	**ECTS**
Total workload	123	4
Contact hours	81	2
Practical activities	45	2