STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Electronics		**1010604131010610427**
Field of study: **Aerospace Engineering**	Profile of study (general academic, practical): **general academic**	Year /Semester: **2 / 3**
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): **part-time**	
No. of hours: Lecture: **9** Classes: **-** Laboratory: **9** Project/seminars: **-**		No. of credits: **2**
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 %): **2 100%** **2 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	The student has a basic knowledge of the basics of electrotechnics and electronics.
2	**Skills**	The student can integrate the obtained information, make their interpretation, draw conclusions; can combine simple electronic circuits.
3	**Social competencies**	The student is aware of the importance and understands the non-technical aspects and effects of transport activities.

Assumptions and objectives of the course:

Understanding the construction and operation of basic semiconductor devices and electronic circuits used in electronic devices.

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

Knowledge:

1. Has basic knowledge of standardized principles of construction record and engineering graphics - [M1_W06]
2. Has knowledge in physics, including the basics of classical mechanics, optics, electricity and magnetism, solid state physics, quantum and nuclear physics, necessary to understand specialized lectures in the theory of construction materials and materials, theory of machines and mechanisms, the theory of electric drives and mechatronic systems - [M1_W02]

Skills:

1. Is able to search in catalogs and on manufacturers' websites ready machine components for use in own projects. - [M1_U02]
2. He can create a circuit diagram, select elements and perform basic calculations using ready-made computational packages of mechanical, hydrostatic, electric or hybrid machine drive system. - [M1_U16]

Social competencies:

1. Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in the event of difficulties in solving the problem - [M1_K02]

Assessment methods of study outcomes

Evaluation based on the written test and passed laboratory classes (reports + tests).

Course description

-Electronics of the basic concepts - the concept of electronics and microelectronics, electronic circuits, integrated circuits, materials for the construction of electronic circuits, semiconductors, electrical signals and their parameters, physical units, electronic diagrams.

-Diode in rectifying circuits and stabilizers - the basics of operation, construction, characteristics and parameters. Half full and periodic rectifiers, construction and characteristics of the voltage stabilizer.

- Field and bipolar transistors - construction, characteristics and application.

- Vibration generators - C, LC, RC - vibration generation conditions, methods of frequency calculation, sinusoidal and rectangular oscillation generators, basic parameters.

-Filters - types, characteristics, construction diagrams, rules for determining the cut-off frequency and application.

- Amplifiers in electronic circuits - differentiating, integrating and adding circuits, examples of applications.

- Logic circuits - construction and operation of basic logic gates.

- As part of laboratory classes, students become acquainted with the issues discussed in the lecture by building, researching and determining the characteristics of electronic circuits in the LTSpice software.

Basic bibliography:

1. Herner A., Riehl H.J. : Elektrotechnika i elektronika w pojazdach samochodowych. WKIŁ 2006r.
2. Rusek M., Pasiebiński J.: Elementy i układy elektroniczne w pytaniach i odpowiedziach. WNT Warszawa 1997r.
3. Dobrowolski A., Majda E., Jachna Z., Wierzbowski M.: Elektronika ależ to bardzo proste, BTC Legionowo 2013r.

Additional bibliography:

Result of average student's workload

Activity	Time (working hours)
1. Participation in the lecture	9
2. Preparation for laboratory exercises	4
3. Participation in laboratory exercises	9
4. Preparation of the report	12
5. Preparation for passing	14
6. Participation in consultations	1
7. Participation in the test	2

Student's workload

Source of workload	hours	ECTS
Total workload	51	2
Contact hours	21	1
Practical activities	25	1