



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Aviation and rocket fuels

### Course

Field of study

Aviation and Cosmonautics

Area of study (specialization)

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

1/1

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

15

Other (e.g. online)

Tutorials

Projects/seminars

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

dr Edyta Janeba\_Bartoszewicz

Responsible for the course/lecturer:

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bartoszewicz@put.poznan.pl

Faculty of Civil Engineering and Transport

### Prerequisites

Knowledge: has knowledge of physics covering the basics of classical mechanics, optics, electricity and magnetism, solid state physics, quantum and nuclear physics

Skills: the ability to self-educate with the use of modern didactic tools and obtain information from the literature.

Social competences: understand the need to learn

### Course objective

Getting to know the basic relationships describing the physical and chemical properties of aviation and rocket fuels.



### Course-related learning outcomes

#### Knowledge

Student has extended knowledge necessary to understand the profiled subjects and specialist knowledge about the construction, construction methods, manufacturing, operation, air traffic management, safety systems, economic, social and environmental impact in the field of aviation and astronautics, has detailed knowledge of chemistry, combustion processes, stoichiometry, heat release processes, heat-to-thrust conversion for aviation and aerospace fuels.

#### Skills

Student can communicate using various techniques in the professional and other environments using the formal notation of construction, technical drawing, concepts and definitions of the field of study studied, has the ability to self-educate with the use of modern teaching tools, such as remote lectures, internet websites and databases, teaching programs, and e-books.

Student is able to obtain information from literature, the Internet, databases and other sources. Can integrate the obtained information, interpret and draw conclusions from it, and create and justify opinions.

#### Social competences

Student understands the need for lifelong learning; can inspire and organize the learning process of other people.

He is ready to critically evaluate his knowledge and perceived content, recognize the importance of knowledge in solving cognitive and practical problems, and consult experts in the event of difficulties in solving the problem on his own.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified on the basis of a written exam in the form of a test.

The skills acquired during the classes are verified on the basis of a final test in the form of a written test and obligatory individual reports on laboratory classes.

### Programme content

Physicochemical characteristics of fuels. Fuel burning process. Rheology. Interfacial (surface) phenomena. Classification of fuels used in aviation. Combustible ingredients. Stabilizers. Fuels with polymers and synthetic polycondensates. Fuels with derivatives of natural substances. Potential threats resulting from the exploitation of fuels used in aviation.



### Teaching methods

Information and problematic lecture with a multimedia presentation. Classes - laboratory (experiment) method.

### Bibliography

#### Basic

1. Górska K., Górsk W.: Napędy lotnicze. Materiały pędne i smary, WKiŁ, Warszawa 1986
2. Krowicki K., Styczewski M : Stałe paliwa rakietowe, WMON, 2000

#### Additional

1. Bogdannienco J.: Odnawialne źródła energii, Biblioteka Problemów, PWN, Warszawa 1989
2. Lotko W., Zasilanie silników wysokoprężnych paliwami węglowodorowymi i roślinnymi, WNT, Warszawa 1997.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,0
Classes requiring direct contact with the teacher	45	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	15	0,5

<sup>1</sup> delete or add other activities as appropriate