



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Propellants and lubricants

### Course

Field of study

Aerospace Engineering

Area of study (specialization)

Aeronautical Engineering

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

15

Laboratory classes

0

Other (e.g. online)

Tutorials

Projects/seminars

### Number of credit points

1

### Lecturers

Responsible for the course/lecturer:

dr Edyta Janeba-Bartoszewicz

Responsible for the course/lecturer:

prof. dr hab. inż. Wiesław Zwierzycki

Faculty of Civil and Transport Engineering

Faculty of Civil and Transport Engineering

### Prerequisites

Has knowledge of physics, covering the basics of classical mechanics, optics, electricity and magnetism, solid state physics, quantum and nuclear physics. Has the ability to self-educate with the use of modern didactic tools, is able to obtain information from literature. Understands the need to learn.

### Course objective

Understanding the basic relationships describing the physical and chemical properties of fuels and lubricants with regard to their storage conditions.

### Course-related learning outcomes

Knowledge

Has an ordered, theoretically founded general knowledge covering key issues in the field of the impact of aerial on the natural environment, emission of toxic compounds from aircraft propulsion, acoustic emission of flying objects. Has detailed knowledge of chemistry, combustion processes, stoichiometry, heat release processes, heat-to-thrust conversion for aerial and aerospace fuels. Has ordered,



theoretically founded general knowledge covering key issues in the field of flight safety and risk assessment.

#### Skills

The student has the ability to self-educate with the use of modern didactic tools, such as websites, e-books. The student is able to obtain information from literature, the Internet, databases and other sources. Is able to integrate the obtained information, interpret and draw conclusions from it, and create and justify opinions. Student is able to use formulas and tables in technical calculations. Can use basic technical standards concerning unification, safety and recycling.

#### Social competences

The student understands the need for lifelong learning; is able to inspire the learning process of others  
The student is ready to critically assess their knowledge and received content, recognize the importance of knowledge in solving cognitive and practical problems.

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written exam - test

#### Programme content

Aerial fuel storage (tanks, piping system, instrumentation, security systems). Research on aerial fuels and lubricants. Airport fuel diagnostic system. Fuel and lubricants for spacecraft.

#### Teaching methods

Informative (conventional) lecture (providing information in a structured way) - may be of a course (introductory) or monographic (specialist) character

#### Bibliography

##### Basic

1. Górski K., Górski W., Napędy lotnicze. Materiały pędne i smary, Wydawnictwo Komunikacji i łączności, Warszawa - 1986
2. Zwierzycki W., Płyny eksploatacyjne do środków transportu drogowego, Wydawnictwo Politechniki Poznańskiej, Poznań - 2006

##### Additional

1. Czarny R., Smary plastyczne, Wyd. NT, Warszawa 2004



### Breakdown of average student's workload

	Hours	ECTS
Total workload	30	1,0
Classes requiring direct contact with the teacher	15	0,5
Student's own work (literature studies, preparation for laboratory classes, preparation for exam, <sup>1</sup>	15	0,5

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