



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Fuels in aviation

### Course

Field of study

Aerospace Engineering

Area of study (specialization)

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

1/2

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

0

Tutorials

0

Projects/seminars

15

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

dr inż. Mateusz Nowak

Responsible for the course/lecturer:

Instytut Silników Spalinowych i Napędów

mateusz.s.nowak@put.poznan.pl

61 665 2252

### 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 aviation fuels with regard to their storage conditions.

### Course-related learning outcomes

Knowledge



1. Has extended knowledge necessary to understand the profile subjects and specialist knowledge about the construction, methods of construction, production, operation, air traffic management, safety systems, impact on the economy, society and the environment in the field of aviation and cosmonautics for selected specialties: Civil Aviation, UAV.
2. Has detailed knowledge of chemistry, combustion processes, stoichiometry, heat release processes, heat-to-thrust conversion for aviation and aerospace fuels
3. Has structured and theoretically founded knowledge about the application, rheology, properties of propellants and lubricants used in aviation and aerospace

#### Skills

1. is able to communicate using various techniques in the professional environment and other environments using the formal notation of construction, technical drawing, concepts and definitions of the scope of the study field .
2. has the ability to self-educate with the use of modern teaching tools, such as remote lectures, websites and databases, teaching programs, e-books.
3. can 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
4. is able to carry out detailed technical calculations in the field of fluid mechanics, thermodynamics and combustion, such as e.g. heat and mass balances, calculate thermodynamic waveforms in thermal flow machines, in particular flow and rocket engines
5. is able to apply basic technical standards concerning unification and safety and recycling

#### Social competences

1. Understands the need for lifelong learning; can inspire and organize the learning process of other people.
2. Is ready to critically evaluate the knowledge and content received, recognize the importance of knowledge in solving cognitive and practical problems, and consult experts in case of difficulties in solving the problem on its own.

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

Learning outcomes presented above are verified as follows:

Passing the lecture in writing, passing the laboratories on the basis of reports from exercises and partial tests, passing the project on the basis of completed tasks.

#### Programme content

aviation fuel storage (tanks, piping system, instrumentation, security systems).

Aviation fuel research.



Airport fuel diagnostic system.

Fuel for spacecraft.

### Teaching methods

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

Laboratory method

Project

### 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
3. Krowicki K., Styczewski M : Stałe paliwa rakietowe, WMON, 2000

Additional

### Breakdown of average student's workload

	Hours	ECTS
Total workload	85	3,0
Classes requiring direct contact with the teacher	55	2,0
Student's own work (literature studies, preparation for laboratory classes, preparation for tests and exam, project preparation) <sup>1</sup>	30	1,0

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