



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Fluid mechanics

Course

Field of study

Aerospace Engineering

Area of study (specialization)

-

Level of study

First-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

Other (e.g. online)

Tutorials

15

Projects/seminars

Number of credit points

1

Lecturers

Responsible for the course/lecturer:

Prof. dr hab inż. Andrzej Frackowiak

Responsible for the course/lecturer:

email: andrzej.frackowiak@put.poznan.pl

tel. 616652212

Wydział Inżynierii Środowiska i Energetyki

ul. Piotrowo 3 60-965 Poznań

Prerequisites

Mathematics and physics news in the field of study program. The student is able to describe the basic physical phenomena and perform calculations related to them. The student is able to determine the priorities important in solving the tasks set before him. The student demonstrates independence in solving problems, acquiring and improving acquired knowledge and skills.

Course objective

To familiarize students with the theoretical foundations and applications of fluid mechanics.

Course-related learning outcomes

Knowledge



1. Has knowledge in the field of fluid mechanics necessary to understand and describe the basic issues related to aviation engineering
2. Has basic knowledge of measurement methods used in fluid mechanics in the scope of stationary and non-stationary processes, measurement systems, measurement errors - the impact of external factors, statistical analysis of measurement results, principles of organization of active and passive experiment
3. Has ordered, theoretically founded general knowledge covering key issues in the field of fluid mechanics, in particular aerodynamics, i.e. ideal liquids and gases, viscous Newtonian and non-Newtonian liquids, theory of heat-flow machines

Skills

1. Has the ability to self-study with the use of modern teaching tools, such as websites, databases and electronic publications
2. Is able to carry out elementary technical calculations in the field of fluid mechanics, such as mass and energy balances, pressure losses in restricted flows in ducts and free around technical flying objects and their modules, select parameters of fans, compressors and turbines for flow systems
3. Is able to carry out a research experiment using measuring apparatus, is able to make measurements, such as measurements of pressure, speed and mass flow, acting forces, and interpret results and draw conclusions K

Social competences

1. Is aware of the importance of maintaining the principles of professional ethics
2. Is able to properly prioritize the implementation of tasks specified by himself or other in the field of fluid mechanics based on the available knowledge
3. Understands the need for critical assessment of knowledge and continuous learning

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: exam

Exercises: tests

Programme content

Subject of fluid mechanics. Continuous media model. Some concepts and theorems of fluid kinematics. Power line. Current surface. Fluid element path. Acceleration of fluid element. Substantive, convective and local derivative. Circulation. The principle of mass conservation. Forces affecting the fluid. General motion properties of non-viscous and non-conductive fluids. Fluid statics. Determination of equipotential surfaces and pressure distribution. Liquid pressure on the walls of solids. Swimming and stability of floating bodies.



PART - 66 (THEORY - 22.5 hours)

MODULE 2. PHYSICS

2.2 Mechanics

2.2.4 Fluid dynamics

- a) Specific gravity and density;
- b) Viscosity, fluid resistance, effects of streamlining;

Effects of compression of fluid; [2]

Teaching methods

1. Lecture: multimedia presentation and on the board.
2. Accounting exercises: examples analyzed on the board and self-made by students

Bibliography

Basic

1. Ciałkowski M., Mechanika Płynów. Skrypty Uczelniane. Wydawnictwo Politechniki Poznańskiej.
2. Ciałkowski M., Bartoszewicz J., Frąckowiak A., Grudziński M., Grzelczak M., Kołodziej J., Piątkowski R., Rybarczyk J., Wróblewska A., Mechanika płynów: zbiór zadań z rozwiązaniami, Wydawnictwo Politechniki Poznańskiej, Poznań 2008.
3. Prosnak W.J. Mechanika Płynów, t. I. PWN Warszawa 1971

Additional

1. . Gołębiewski C., Łuczywek E., Walicki E., Zbiór zadań z mechaniki płynów, PWN Warszawa 1978

Breakdown of average student's workload

| | Hours | ECTS |
|--|-------|------|
| Total workload | 40 | 1,0 |
| Classes requiring direct contact with the teacher | 30 | 1,0 |
| Student's own work (literature studies, preparation for tutorials, preparation for tests) ¹ | 10 | 0,4 |

¹ delete or add other activities as appropriate