COURSE DESCRIPTION CARD - SYLLABUS

Course name

Flight mechanics

Course

Field of study

Aerospace Engineering

Year/Semester

3/5

Area of study (specialization)

Aircraft engines and airframes

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

polish

Form of study

full-time

Requirements

elective

Number of hours

Lecture

15

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

15

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

PhD inż. Łukasz Brodzik

email: lukasz.brodzik@put.poznan.pl

tel.: 61 665 2213

Faculty of Environmental Engineering and Energy

Piotrowo 3 st., 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Student should have knowledge of mathematics, physics and aerodynamics presented in the studies. He should be able to obtain information from the indicated sources of literature, the Internet and other sources, use formulas, tables and technical calculations. He should be able to understands the need to expand their competencies and has the willingness to cooperate in a team.

Course objective

Teaching basic laws and dependencies regarding stability and control in the field of flight mechanics of aircraft, as well as familiarizing with basic equilibrium equations of helicopters in different flight states.

Course-related learning outcomes

Knowledge

1. has knowledge in mathematics, including algebra, analysis, theory of differential equations, analytical geometry necessary to understand and describe the basic issues related to flight mechanics

2. has detailed knowledge related to selected issues in the field of flight mechanics of aircrafts, in particular related to the description of determined flight conditions

3. has ordered, theoretically founded general knowledge covering key issues in the field of fluid mechanics, in particular aerodynamics, necessary to determine the forces acting on an airplane

Skills

1. has the ability to self-study using modern teaching tools, such as websites and databases of aircraft performance information, as well as e-books

2. can explain and describe in a general way selected flight states of the aircraft

3. can use patterns associated with the description of aircraft movement

Social competences

1. is aware of the importance of maintaining the principles of professional ethics in analyzing and presenting issues of flight mechanics

2. is able to properly set priorities for the implementation of a specific task based on the available knowledge of the mechanics of aircraft flight

3. understands the need for a critical assessment of knowledge of flight mechanics and its exploration in more detailed aspects affecting the state of flight

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written exam from the lecture

Written exam from project

Programme content

Static, dynamic and controllability of aircraft, the phenomenon of stable and unstable corkscrew, selected aerobatics, basic concepts related to helicopters, helicopter classification, basics of rotor aerodynamics, horizontal movement with helicopter descending and rising, helicopter takeoff and landing

PART - 66 (THEORY - 15 hours)

MODULE 8. BASICS OF AERODYNAMICS

8.3 Theory of Flight

Influence of load factors: stall, flight envelope and design limitations;

Increasing the lift. [2]

8.4 Flight stability and dynamics

Longitudinal, lateral and directional stability (active and passive). [2]

Teaching methods

1. Lecture: multimedia presentation

2. Project: preparation of a written study of a selected project

Bibliography

Basic

1. Krzyżanowski A., Mechanika lotu śmigłowców, WAT, Warszawa 2010

2. Fiszdon W., Mechanika lotu cz. 1 i 2, PWN, Warszawa 1961

3. Hull D.G., Fundamentals of Airplane Flight Mechanics, Springer, 2007

Additional

-

Breakdown of average student's workload

	Hours	ECTS
Total workload	77	3,0
Classes requiring direct contact with the teacher	43	1,7
Student's own work (literature studies, preparation for exam, project preparation) [1]	34	1,3

[1] delete or add other activities as appropriate