COURSE DESCRIPTION CARD - SYLLABUS

Course name
Principals of CFD

Course

Field of study
Aerospace Engineering

Year/Semester
1/2

Area of study (specialization)
-

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars
15

Number of credit points

2

Lecturers

Responsible for the course/lecturer:
Dr inż, Bartosz Ziegler

email: bartosz.ziegler@put.poznan.pl

ul. Piotrowo 3 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Student has required knowledge, necessary for understanding of profile subjects and specialist knowledge about construction, methods of construction, manufacturing, exploitation, air traffic management, security systems, impact on the economy, society and environment of the aviation and cosmonautics for selected specialties

Student has basic knowledge in the field of numerical methods, numerical gas dynamics, , using specialized software or tools created independently

Student has the ability to self-study using modern teaching tools, such as remote lectures, websites and databases, didactic programs, e-books

Student can obtain information from literature, the Internet, databases and other sources. Can integrate the information obtained and interpret conclusions and create and justify opinions

Student understands the need to learn throughout life; he can inspire and organize the learning process of other people

Student 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 the case of difficulties in solving the problem

Course objective

Course objective is to deliver specialistic knowledge on Computational Fluid Dynamics in terms of its theory and application

Course-related learning outcomes

Knowledge

tudent has extensive knowledge, necessary for understanding of profile subjects and specialist knowledge about construction, methods of construction, manufacturing, exploitation, air traffic management, security systems, impact on the economy, society and environment of the aviation and cosmonautics for selected specialties:

1. Aeronautical Engineering

2. Space Engineering

3. Civil Aviation

4. Virtual Engineering in Aeronautics"

Student has ordered, supplemented with theoretical issues knowledge in the field of numerical methods, analysis of the movement of air and space vessels, numerical gas dynamics, numerical strength calculations, flutter calculations and other phenomenas, using specialized software or tools created independently

Skills

Student is able to communicate using various techniques in a professional environment and other environments using a formal record of construction, technical drawing, concepts and definition of the scope of the studied field of study

Student has the ability to self-study using modern teaching tools, such as remote lectures, websites and databases, didactic programs, e-books

Student can obtain information from literature, the Internet, databases and other sources. Can integrate the information obtained and interpret conclusions and create and justify opinions

Social competences

Student understands the need to learn throughout life; he can inspire and organize the learning process of other people

Student 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 the case of difficulties in solving the problem

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Exam (L), Project assignment (P)

Programme content

- Historical note: CFD Methods

- Reminder: fluid in motion, the N-S equations

- Principals of turbulence modelling

- Spatial and Temporal discretization

- Linearization and stabilization of differential equations

Teaching methods

auditorium lecture, small group projects

Bibliography

Basic

ANSYS Fluent 2019R1 Theory Guide

J.D. Anderson - COMPUTATIONAL FLUID DYNAMICS. The Basics with Applications

Additional

S. Aranda, 3D Printing Failures

P. Siemiński, G. Budzik , Techniki przyrostowe : druk drukarki 3D, Warszawa, 2015

ANSYS Inc., ANSYS Mechanical APDL Introductory Tutorials, 2013

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,0
Classes requiring direct contact with the teacher	36	1,2
Student's own work (literature studies, preparation, preparation for tests/exam, project preparation) [1]	24	0,8

[1] delete or add other activities as appropriate