COURSE DESCRIPTION CARD - SYLLABUS

Course name
Data analysis

Course

Field of study
Aviation

Year/Semester
III/6

Area of study (specialization)
Aircraft engines and airframes

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
english

Form of study
full-time

Requirements
elective

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 Jedrzej Mosiężny

Jedrzej.mosiezny@put.poznan.pl

Responsible for the course/lecturer:

Prerequisites

Has basic knowledge on construction of aircraft, flight dynamics and aerodynamics.Has the capability of performing basic of performing basic algebraic and differential computations

Course objective

The goal of the study is to project knowledge and skills in area of aircraft design

Course-related learning outcomes

Knowledge

1. has extended and in-depth knowledge of mathematics including algebra, analysis, theory of differential equations, probability, analytical geometry as well as physics covering the basics of classical mechanics, optics, electricity and magnetism, solid state physics, thermodynamics, useful for formulating and solving complex technical tasks related to engineering aeronautical and modeling

2. has ordered and theoretically founded general knowledge in the field of key technical issues and detailed knowledge of selected issues related to air transport, knows the basic techniques, methods and tools used in the process of solving tasks related to air transport, mainly of an engineering nature

3. has the ability to self-study with the use of modern teaching tools, such as remote lectures, websites and databases, teaching programs, e-books

Skills

1. is able to obtain information from various sources, including literature and databases, both in Polish and in English, integrate them properly, interpret them and make a critical evaluation, draw conclusions and exhaustively justify the opinions they formulate

2. is able to properly use information and communication techniques, applicable at various stages of the implementation of aviation projects

3. is able to properly plan and perform experiments, including measurements and computer simulations, interpret the obtained results, and correctly draw conclusions from them

4. can, when formulating and solving tasks related to civil aviation, apply appropriately selected methods, including analytical, simulation or experimental methods

5. can solve tasks using the rules of air traffic and design a runway in accordance with the applicable ICAO requirements

6. student can use theoretical probability distributions. Student is able to analyze and interpret statistical data. Student is able to use the methods and tools of mathematical statistics in engineering practice

7. is able to prepare a short research paper while maintaining the basic editorial rules. He can choose appropriate methods for the conducted research and is able to carry out a basic analysis of the results.

8. is able to organize, cooperate and work in a group, assuming various roles in it, and is able to properly define priorities for the implementation of a task set by himself or others

9. is able to plan and implement the process of own permanent learning and knows the possibilities of further education (2nd and 3rd degree studies, postgraduate studies, courses and exams conducted by universities, companies and professional organizations)

Social competences

1. understands that in technology, knowledge and skills very quickly become obsolete

2. is aware of the importance of knowledge in solving engineering problems and knows examples and understands the causes of faulty engineering projects that have led to serious financial and social losses, or to a serious loss of health and even life

3. is aware of the social role of a technical university graduate, in particular understands the need to formulate and provide the society, in an appropriate form, with information and opinions on engineering activities, technological achievements, as well as the achievements and traditions of the engineer profession

4. correctly identifies and resolves dilemmas related to the profession of an aerospace engineer

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: 90 minute assignment in the last lecture. Test consists of 10 closed, single choice tasks (estimated time per task - 2 minutes) and 10 short opne calculation tasks (estimated time per task - 5 minutes) relevant to tasks presented on the lecture. Correct answer for closed tasks is worth 1 point. Open tasks are given 0-2 points with 0.5 point grading. Fully accomplished task cosists of a schematic (if needed), equations, calculations and unit calculations. Tasks are independent, answer from previous task is not required to following task. Passing the test requires 50% of points.

Project: Passing the project is based on minimum 5, maximum 7 project assignments relevant to the lectures. A project task is based on a elaborate calculations completed with specialistic software or self written scripts. Estimated time for completing a task - 13 days. Tasks shall be submitted via univerisites e-mail before given deadline. Tasks are graded from 0 - 10 points. Grading criteria are dependent on the task and comminicated during assignment. Task submitted after a deadline and/or by and to a non-univerisity e-mail are graded with 0 points. Tasks completed with use of references without pointing the reference sources (plagiarism, copycat works) are graded with 0 points. Criteria for passing a single assignment: obtaining 50% of points. Criteria for passing the class: obtaining 50% of total available point from all assignments and passing minimum of 70% of assignments.

Programme content

1. Data analysis workflow

2. Basics of python 3.x workflow

3. Basics of statistics and probabilistics, testing of statistical hypotheses

4. Experimental data analysis

5. Numerical data analysis

6. Python libraries overview

7. Multidimensional dataset visualization

Teaching methods

Live coding based lecture, project classes in computer laboratory with practical examples of calculations presented on lecture

Bibliography

Basic

1. Joel Gruss. Data Science from Scratch

2. Jake VanderPlas. Python Data Science Handbook

3. Peter C. Bruce, Andrew. Practical Statistics for Data Science

Additional

Python 3.x manual

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	30	1,5
Practical Activities [1]	20	0,5

[1] delete or add other activities as appropriate