



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Statistics

### Course

Field of study

Aerospace Engineering

Area of study (specialization)

Level of study

First-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

0

Other (e.g. online)

0

Tutorials

15

Projects/seminars

0

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

dr Ewa Bakinowska

Responsible for the course/lecturer:

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### Prerequisites

The student has basic knowledge of combinatorics and theory of probability resulting from the school program. The student has basic knowledge of mathematical analysis (differential calculus of functions of one variable, integral calculus of functions of one variable and basics of matrix algebra). He can think logically. The student is aware of the learning purpose.

The student is able to apply the language of mathematics (differential and integral calculus) to describe simple problems in technology. Is able to obtain information from literature.

The student is aware of the purpose of learning.



## Course objective

The aim of the course is to familiarize students with the basic issues of statistics in order to solve simple practical problems.

## Course-related learning outcomes

### Knowledge

The student knows the basic distributions of statistics from the sample. Has basic knowledge of basic statistical inference: the theory of estimation, the theory of statistical hypothesis testing, the theory of regression analysis. Students acquire the ability to apply basic statistical methods to solve simple engineering problems.

The student has ordered knowledge of terminology in the field of statistics. Has knowledge in mathematics necessary for statistical analysis

### Skills

The student is able to communicate using the concepts and definitions of the basics of statistics.

The student has the ability to self-educate with the use of modern didactic tools, such as remote lectures, internet websites and databases.

The student is able to obtain information from literature, the Internet, databases and other sources.

The student is able to use the formulas and statistical tables.

### Social competences

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

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Assessment of knowledge and skills acquired during the lecture is verified on the basis of a written test.

Tutorials: The assessment of knowledge and skills acquired in tutorials is verified on the basis of written tests.

## Programme content

### LECTURE

1. Probability space.
2. Axiomatic definition of probability, classical probability.
3. Conditional probability.
4. Discrete random variable.



5. Continuous random variable.
6. Elements of descriptive statistics.
7. Covariance of sample and sample linear correlation coefficient.
8. Point estimation.
9. Confidence intervals.
10. Tests of significance for one population, expected value.
11. Linear regression.

Tutorials:

1. Conditional probability.
2. Discrete random variable.
3. Continuous random variable.
4. Elements of descriptive statistics.
5. Covariance of sample and sample linear correlation coefficient.
6. Point estimation.
7. Confidence intervals.
8. Tests of significance for one population, expected value.
9. Linear regression.

### Teaching methods

A lecture with a multimedia presentation supplemented with current solutions of practical examples. Interactive lecture with the formulation of current questions for a group of students. Students actively participate in the lecture. Each presentation of a new topic is preceded by a reminder of the content related to the discussed issue (e.g. content known to students from other subjects).



Tutorials: Students are given problems to be solved during tutorials. The needed theory, formulas and graphs are made available to students. The tasks are solved together with the teacher with the active participation of students.

### Bibliography

#### Basic

1. D. Bobrowski, (1986) Probabilistyka w zastosowaniach technicznych, Wydawnictwo Naukowo Techniczne.
2. D. Bobrowski, K. Maćkowiak-Łybacka, (2006) Wybrane metody wnioskowania statystycznego, Wydawnictwo Politechniki Poznańskiej.
3. J. Koronacki, J. Melniczuk (2001) Statystyka dla studentów kierunków technicznych i przyrodniczych. WNT, Warszawa.

#### Additional

1. Plucińska A., Pluciński E., Probabilistyka, Wydawnictwo WNT, Warszawa

### Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	35	1,0
Student's own work (literature studies, preparation for tutorials, preparation for tests, preparation for passing the lecture) <sup>1</sup>	15	1,0

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