COURSE DESCRIPTION CARD - SYLLABUS

Course name

Statistics

Course

Field of study

Aerospace Engineering

Year/Semester

2/2

Area of study (specialization)

-

Profile of study

practical

Level of study

Second-cycle studies

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

30

Laboratory classes

0

Other (e.g. online)

0

Tutorials

30

Projects/seminars

0

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Piotrowo 3A, 60-965 Poznań

Responsible for the course/lecturer:

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, differential calculus of functions of many variables, integral calculus of functions of one variable and basics of matrix algebra). He can operate a computer. 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. The student has the ability to self-study using modern teaching tools. Is able to obtain information from literature.

Course objective

The aim of the course is to familiarize students with selected problems of probability and mathematical statistics. Students acquire the ability to use probabilistic and statistical methods to describe technical issues.

Course-related learning outcomes

Knowledge

The student knows the basic distributions of statistics from the sample. Has basic knowledge of statistical inference: the theory of estimation, the theory of statistical hypothesis testing, the theory of regression analysis. The student knows the assumptions and the method of creating a regression model for the studied phenomenon. Has extensive knowledge of mathematical modeling. He knows the methods of applying the known statistical methods in technical sciences.

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

Skills

Student can communicate using various techniques in a professional environment using formal statistical notation and concepts and definitions in the field of mathematical statistics

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

Student can obtain information from literature, the Internet, databases and other sources. He is able to obtain information in the field of statistics and data analysis, interpret and draw conclusions from them and create and justify opinions

Student can use statistical formulas and tables.

Social competences

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

Student is ready to critically evaluate his knowledge and content, recognize the importance of knowledge in solving cognitive and practical problems

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. Combinatorics. Evets. Probability space. Axiomatic definition of probability, classical probability. Conditional probability, Bayesian model.

2. Random variable, distribution function, expected value, variance. Discrete random variable.

3. Discrete distributions.

4. Continuous random variable.

5. Continuous distributions. Distribution of the mean and the sum of random variables

6. Elements of descriptive statistics: location measures and variability measures

7. Elements of descriptive statistics: two dimensional data

8. The two-dimensional random variable. The independence of random variables.

9. Point estimation. Confidence intervals.

10. Tests of significance: expected value, variance, proportion (one population).

11. Tests of significance: expected value, (two populations).

12. Tests of significance: variance, proportion (two populations).

13. Linear regression. Testing the significance of regression.

14. Analysis of variance.

15. Non-parametric tests

TUTORIALS

1. Combinatorics. Evets. Probability space. Axiomatic definition of probability, classical probability. Conditional probability, Bayesian model.

2. Random variable, distribution function, expected value, variance. Discrete random variable.

3. Discrete distributions.

4. Continuous random variable.

5. Continuous distributions. Distribution of the mean and the sum of random variables

6. Elements of descriptive statistics: location measures and variability measures

7. Elements of descriptive statistics: two dimensional data

8. Point estimation. Confidence intervals.

9. Tests of significance: expected value, variance, proportion (one population).

10. Tests of significance: expected value, (two populations).

11. Tests of significance: variance, proportion (two populations).

12. Linear regression. Testing the significance of regression.

Teaching methods

The lecture conducted with a multimedia presentation supplemented with examples given on the board. The lecture was conducted in an interactive way with the formulation of current questions to a group of students. Students actively participate in the lecture. Each presentation of a new topic is preceded by a reminder of content related to the issue (content known to students in other subjects).

Tutorials: All students receive electronically a list of tasks that are solved in the nearest tutorials. The theory, formulas and charts they need are provided electronically. Tasks are solved by students Frequent homeworks activate students to work systematically.

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.

4. W. Kordecki (2010) Rachunek prawdopodobieństwa i statystyka matematyczna, Definicje, twierdzenia, wzory, Oficyna Wydawnicza GiS.

5. H. Jasiulewicz, W. Kordecki, (2003) Rachunek prawdopodobieństwa i statystyka matematyczna, Przykłady i zadania Oficyna Wydawnicza GiS

Additional

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

2. R. L. Scheaffer, J. T. McClave (1995) Probability and Statistics for Engineers, Duxbury

Breakdown of average student's workload

	Hours	ECTS
Total workload	85	3,0
Classes requiring direct contact with the teacher	60	2,0
Student's own work (literature studies, preparation for tutorials, preparation for tests, preparation for passing the lecture) [1]	25	1,0

[1] delete or add other activities as appropriate