COURSE DESCRIPTION CARD - SYLLABUS

Course name
Basics of statistics [S1Bud1>PS]

Course

Field of study
Civil Engineering

Year/Semester
1/2

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
15

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

dr Ewa Bakinowska
ewa.bakinowska@put.poznan.pl

Lecturers

dr Mateusz John
mateusz.john@put.poznan.pl

mgr inż. Jagoda Papis
jagoda.papis@put.poznan.pl

dr Ewa Bakinowska
ewa.bakinowska@put.poznan.pl

Prerequisites

The student has basic knowledge of combinatorics and probability calculus resulting from the school curriculum. The student has basic knowledge of mathematical analysis (differential calculus, integral calculus and the basics of matrix algebra). He can operate a computer. Can think logically. The student is aware of the purpose of learning

Course objective

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

Course-related learning outcomes

Knowledge:

The student is able to use the methods and tools of mathematical statistics and R software in engineering practice, in solving technical problems. KB_U07, P6S_UW (I), P6S_UK (O)

Skills:
The student has basic general knowledge of statistics. He knows various methods of statistical inference. He knows how to use them in solving technical problems, including those related to construction. Has structured and theoretically based knowledge in the field of statistical analyzes supported by computer software: knows the basics of software used for statistical calculations (R program). KB_W01, P6S_WG (O)

Social competences:
The student is responsible for the reliability of the results of his work and their interpretation KB_K02, P6S_KK (O)

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

Programme content

1. Discrete random variable.
2. Continuous random variable.
3. Elements of descriptive statistics.
4. Estimation.
5. Tests of significance for one population.
6. Tests of significance for two populations.
7. Linear regression.

Course topics

LECTURE
1. Discrete random variable. Discrete distributions.
2. Continuous random variable. Continuous distributions.
3. Elements of descriptive statistics. Covariance of sample and sample linear correlation coefficient.
4. Point estimation. Confidence intervals.
5. Tests of significance for one population.
6. Tests of significance for two populations.
7. Linear regression.

LABORATORY CLASSES
1. Introduction to the R program.
2. Discrete random variable. Discrete distributions.
3. Continuous random variable. Continuous distributions.
4. Elements of descriptive statistics.
5. Covariance of sample and sample linear correlation coefficient.
6. Tests of significance for one population.
7. Tests of significance for two populations.

Teaching methods

A lecture with a multimedia presentation supplemented with many examples. Interactive lecture 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 the content related to the discussed issue (content known to students from other subjects).
Laboratories: Students receive an electronic list of tasks that are solved in the laboratories. The needed theory, formulas and graphs are provided electronically. The tasks are solved by students using the R software, with the active participation of the 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.
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
6. T. Górecki (2011), Podstawy statystyki z przykładami w R, Wydawnictwo BTC

Additional:
1. Plucińska A., Pluciński E., Probabilistyka, Wydawnictwo WNT, Warszawa
2. R. L. Scheaffer, J. T. McClave (1995) Probability and Statistics for Engineers, Duxbury
3. Bakinowska E., (2011), A note on solving the likelihood equation in logistic model with the multinomial distribution, Biometrical Letters 48 No1 (23-32)

Breakdown of average student's workload

	Hours	ECTS
Total workload	55	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	25	1,00