



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Engineering statistics

Course

Field of study

Mechanical Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

Number of hours

Lecture

16

Laboratory classes

0

Other (e.g. online)

0

Tutorials

8

Projects/seminars

0

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

Asst. Prof. Eng. Malgorzata Jankowska

Responsible for the course/lecturer:

Prerequisites

Student should have a basic knowledge from the fields of mathematical analysis and algebra of sets. Student should have the ability to think logically and have the knowledge necessary for performing simple mathematical calculations. Furthermore, student should have the ability to work alone, self-study and broaden the knowledge based on available literature.

Course objective

Gaining a basic knowledge of probability theory and statistics within the scope specified in the study program. Acquiring a skill to solve basic problems from the fields of probability theory and statistics.

Course-related learning outcomes

Knowledge

1. In-depth knowledge of probability theory and descriptive statistics.
2. The usage of the knowledge to solve basic problems from the fields of probability theory and descriptive statistics (creation of statistical series, graphical and tabular presentation of data, determining numerical descriptive measures).



Skills

1. The use of acquired knowledge in engineering applications.
2. The use of statistics in solving some mechanical problems.
3. The ability to apply basic laws of statistics to interpret the results of investigations.
4. The ability to self-study, including to improve professional and social competences.

Social competences

1. Awareness of the limits of one's own knowledge and understanding the need for further education.
2. Precise formulation of questions used to deepen one's own understanding of a given topic or finding missing elements of reasoning.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures/Exercises

Written exam verifying a knowledge and a proper understanding of the concepts given in the programme content and solving given problems.

Programme content

Probability theory

Events and probability of events. Elementary (simple) events. Totality of events (a field of events). Event. Experiment. Outcome of the experiment. Probability of events. Conditional probabilities. Independent events. Total probability. The law of total probability. The theorem of Bayes.

Random variables. Distribution function. Discrete random variables (probability function, histogram). Continuous random variables (probability density). Numerical descriptive measures (expectation value (mean), variance, standard deviation, kth moment, median).

Selected discrete distributions (discrete uniform distribution, degenerate distribution, Bernoulli distribution, binomial distribution, Poisson distribution). Selected continuous distributions (continuous uniform distribution (rectangular distribution), exponential distribution, normal distribution).

Descriptive statistics

Population. Random sample. Statistical series. Numerical descriptive measures (arithmetic mean, median, mode, variance, standard deviation, range, first quartile, third quartile). Coefficient of variation. Asymmetry coefficient.

Teaching methods

Lectures: Multimedia presentation illustrated with examples solved on the board.



Exercises: Solving of the mechanical problems analytically on the board, performing the tasks proposed by the lecturer.

Bibliography

Basic

1. W. Kryszicki, J. Bartos, W. Dyczka, K. Królikowska, W. Wasilewski, Rachunek prawdopodobieństwa i statystyka matematyczna w zadaniach, część I i II. PWN, Warszawa 1995.
2. D. Bobrowski, K. Łybacka, Wybrane metody wnioskowania statystycznego. Wydawnictwo Politechniki Poznańskiej, Poznań 1995.
3. A. Plucińska, E. Pluciński, Probabilistyka. WNT, Warszawa 2000.
4. D. Bobrowski, Probabilistyka w zastosowaniach technicznych. WNT, Warszawa 1986.
5. A. Plucińska, E. Pluciński, Zadania z rachunku prawdopodobieństwa i statystyki matematycznej. PWN, Warszawa 1978.

Additional

1. D. Bobrowski, K. Maćkowiak-Łybacka, Wybrane metody wnioskowania statystycznego. Wydawnictwo Politechniki Poznańskiej, Poznań 2001.
2. I. Bąk, I. Markowicz, M. Mojsiewicz, K. Wawrzyniak, Statystyka w zadaniach, część I i II. WNT, Warszawa 2002.
3. T. Puchalski, Statystyka - Wykład podstawowych zagadnień. PWN, Warszawa 1977.
4. T. Puchalski, Zadania ze statystyki. PWN, Warszawa 1977.
5. K. Andrzejczak, Statystyka elementarna z wykorzystaniem systemu Statgraphics. Wydawnictwo Politechniki Poznańskiej, Poznań 1997.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	38	2,0
Student's own work (literature studies, preparation for tutorials, preparation for tests/exam) ¹	8	1,0

¹ delete or add other activities as appropriate