COURSE DESCRIPTION CARD - SYLLABUS

Course name
Theory of probability

Course

Field of study
Power Engineering

Year/Semester
1/1

Area of study (specialization)

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
20

Laboratory classes

Other (e.g. online)

Tutorials
10

Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
dr Alina Gleska

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Faculty of Control, Robotics and Electrical Engineering

Responsible for the course/lecturer:

Prerequisites

1. Student has a basic knowledge of calculus, set theory and logic.

2. Student can operate a calculator, is able to use some statistical table and proposed literature.

3. Student recognizes the necessity in deepening his knowledge.Student is conscious to operate in creative and rational way. Student is active during classes.

Course objective

To acquire basic statistical and probabilistic methods and develop the ability to use these methods to solve practical engineering problems

Course-related learning outcomes

Knowledge

Student has a basic knowledge of probability theory, including the rights of probability and a basic knowledge of descriptive and mathematical statistics useful to solve practical engineering problems.

Student knows the basic techniques and tools used to solve simple engineering tasks using information technology and computer support.

Skills

Student is able to select and apply appropriate methods and tools and to use them effectively to solve tasks of mathematical statistics. Student can use information and communication technology for the tasks of typical engineering activities. Student is able to interpret the information from literature, databases and other selected sources and to draw conclusions and formulate and justify opinions.

Social competences

Student is able to argue the necessity of continuous learning. Students are aware of their responsibility for their own work and are) willing to obey the rules of collective work and to take responsibility for collaborative tasks. Student can see cause and effect relationship in achieving the set of goals and rank alternative or competitive tasks.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture - the written exam (three theoretical problems and four exercises).

Tutorials - the test on the last tutorial + additional points for activity (up to 20% of possible points from the test).

Assessment criteria:

below 50% - 2,0 50%-59% - 3,0 60%-69% - 3,5

70%-79% - 4,0 80%-89% - 4,5 90%-100% - 5,0

Programme content

Lecture:

1. Introduction to probability theory

2. Conditional probability, total probability, independence of random variables, Bayes' theorem

3. Discrete random variables. Probability mass function. Cumulative distribution function.

4. Continuous random variables.Probability density function. Cumulative distribution function.

5.Measures of random variables: of central tendency (mean, mode, quartile), dispersion (range, variance, standard deviation, the coefficient of dispersion), skewness.

6. Distributions of discrete random variables and their properties (examples).

7. Distributions of continuous random variables and their properties (examples).

8. Central limit theorems. The law of large numbers (LLN).

9. Point and interval estimations of distribution parameters.

10. Statistical hypothesis testing.

Tutorials:

1. Calculating probabilities. Elements of descriptive statistics.

2. Exercises for discrete and continuous random variables.

3. Estimation of parameters.

4. Statistical hypothesis testing.

5. Final test.

Teaching methods

Lecture - multimedial presentation + examples on the blackboard

Tutorials - solving problems; discussion about obtained results

Bibliography

Basic

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

2. Wasilewska E., Statystyka matematyczna w praktyce, Wydawnictwo Difin, 2015

Additional

1. Krysicki W., Bartos J., Dyczka W., Królikowska K., Wasilewski M., Rachunek prawdopodobieństwa i statystyka matematyczna w zadaniach, cz. I i II, Wydawnictwo PWN, 1998

2. Bobrowski D., Probabilistyka w zastosowaniach technicznych, WNT, 1986

Breakdown of average student's workload

	Hours	ECTS
Total workload	70	3,0
Classes requiring direct contact with the teacher	40	2,0
Student's own work (literature studies, preparation for tutorials, preparation for test and exam, solving problems appeared during lectures but not solved during tutorials) [1]	30	1,0

[1] delete or add other activities as appropriate