COURSE DESCRIPTION CARD - SYLLABUS

Course name
Mathematics [N1Eltech1>Mat3]

Course

Field of study
Electrical Engineering

Year/Semester
2/3

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
22

Laboratory classes
0

Other
0

Tutorials
18

Projects/seminars
0

Number of credit points

5,00

Coordinators

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Lecturers

Prerequisites

A student who starts this subject should have knowledge of mathematics in the field implemented in the 1st and 2nd semester of studies in the field of Electrical Engineering.

Course objective

Providing students with extended knowledge in the field of mathematical analysis and probability, as well as developing the ability to apply it in engineering and preparation for effective study of directional subjects.

Course-related learning outcomes

Knowledge:
Has extended and in-depth knowledge of integral calculus of functions of many variables, ordinary differential equations and probability, necessary for the description and analysis of basic phenomena occurring in electrical engineering.

Skills:
Is able to use known mathematical models to analyze and evaluate the functioning of elements and systems used in electrical engineering.

Social competences:
Understands the importance of knowledge in solving problems and improving professional competences.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
The knowledge acquired during the lecture is verified by activity during the lecture and tutorials, closely related to the lecture. Final verification takes place at the exam after the lecture is finished. Exam issues, on the basis of which 6 differently scored exam questions combined with appropriate tasks are developed, are given in the lecture. You can get up to 6 points for understanding the theory and its skillful application, up to 16 points for solving problems, and up to 4 points for active participation in lectures. Passing threshold: 50% (13 points).
The skills acquired during the tutorials are verified on the basis of two 45-minute tests. Each of them consists of 3 tasks with different points. For each test you can get up to 11 points, for activity during exercises - up to 4 points. Passing threshold: 50% (13 points).

Programme content

Surfaces and curves in space,
line integrals,
ordinary differential equations,
propability theory.

Course topics

Lecture:
1. A plane in space and second-degree surfaces.
2. Straight line and curves in space.
3. Integration methods.
4. Methods of calculating a double integral.
5. Applications of double integral.
6. Undirected line integral.
7. Direct line integral.
8. The relationship between the double integral and the line integral.
9. Applications of line integrals.
10. First order differential equations.
11. Second order differential equations.
12. Laplace transform.
13. Application of Laplace transform to solving differential equations.
14. Elements of the probability theory.
15. Distributions of random variables.

Tutorials:
1. Determination of planes and lines in space.
2. Counting double integrals.
3. Calculation the volume of solids.
4. Calculation of surfaces areas.
5. Counting undirected line integrals.
6. Counting directed line integrals.
7. Solving first order differential equations.
8. Solving second order differential equations.
9. Final test.

Teaching methods

1. Lecture: informative, illustrated with examples given on the board, enriched in the case of drawings with a multimedia presentation. Putting problems up for discussion.
2. Tutorials: performing the tasks given by the teacher, discussing the solutions, examples of solutions given on the blackboard, discussing the solutions.

Bibliography

Basic
1. M. Mączyński, J. Muszyński, T. Traczyk, W. Żakowski, Matematyka - podręcznik podstawowy dla WST, PWN, t. I - Warszawa 1979, t. II - Warszawa 1981.
2. J. Mikołajski, Z. Sołtysiak, Zbiór zadań z matematyki dla studentów wyższych szkół technicznych, Wydawnictwo PWSZ w Kaliszu, cz. I - Kalisz 2009, cz. III - 2008 .
Additional
1. C. L. Mett, J. C. Smith, Calculus with applications, McGraw-Hill Company, New York … 1985.
2. W. Żakowski, Ćwiczenia problemowe dla politechnik, Wydawnictwa Naukowo - Techniczne, Warszawa 1991.

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,00
Classes requiring direct contact with the teacher	70	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	55	2,00