POZNAN UNIVERSITY OF TECHNOLOGY

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Mathematics [N1Eltech1>Mat1]

Course

Field of study	Year/Semester
Electrical Engineering	1/1

Area of study (specialization)	Profile of study
–	general academic

Level of study	Course offered in
first-cycle	Polish

Form of study	Requirements
part-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
30	0	0

Tutorials	Projects/seminars
18	0

Number of credit points

5,00

Coordinators	Lecturers
mgr inż. Marcin Stasiak marcin.stasiak@put.poznan.pl	

Prerequisites

Basic knowledge of elementary functions, trigonometry, mathematical analysis and algebraic operations (secondary school level).

Course objective

The aim is: - to introduce complex numbers and some of their applications, - to introduce some concepts of linear algebra (matrices, systems of algebraic linear equations), - to recognize methods and applications of differential calculus of single variable functions, - to teach how to use those concepts, to make proper transformations and to use appropriate mathematical methods and tools to solve typical engineering tasks.

Course-related learning outcomes

Knowledge:
Student:
1. understands the concept of complex number,
2. knows basic concepts of linear algebra,
3. knows the concept of derivative, methods of solving and its applications.

Skills:
Student:
1. is able to make calculations in complex domain
2. can solve systems of algebraic linear equations
3. can calculate the derivative and find monotonicity, maxima, minima of functions of single variable.

Social competences:
Student is aware of the need to continue increasing their knowledge.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lecture: written test to check theoretical knowledge and the abillity of its practical use. Exam consists of 3 theoretical questions and 3-5 practical tasks. Point range differs for each task. Exam is passed if student gains 50% of all points.
Classes: 2 written tests during the term. Range of notes:
50% - 3.0,
60% - 3,5,
70% - 4,0,
80% - 4,5,
90% - 5,0.

Programme content

Complex numbers,
calculus of matrices,
calculus of vectors,
differential calculus of functions of one variable.

Course topics

Lecture: Complex numbers (algebraic, trigonometric and exponential form, operations on complex numbers). Operations on matrices. Solving of systems of algebraic linear equations. Vector calculus and its applications. Sequences - monotonicity and limit. Euler constant. The concept of function - domain, limits and continuity. The concept of derivative - interpretation and evaluation. The mean value theorems and their applications - finding maxima, minima, describing monotonocity, concavity and points of inflection of functions.
Classes: Operations on complex numbers. Operations on matrices. Determinants. Solving of systems of algebraic linear equations (Gaussian elimination). Limits of sequences and functions. Finding derivatives, extrema and intervals of monotonocity of functions of one variable.,

Teaching methods

1. Interactive lecture with questions to the group of students which is supported by solving examples on board.
2. Classes during which students solve tasks on board.Teacher"s detailed assessment of students" solutions followed by discussion and comments.

Bibliography

Basic
1. G. Decewicz, W. Żakowski, Matematyka : analiza matematyczna. Cz. 1, WNT, Warszawa 2009.
2. I. Foltyńska, Z. Ratajczak, Z. Szafrański, Matematyka, cz. I, II, Wyd. Politechniki Poznańskiej, Poznań 2004.
3. F. Leja, Rachunek różniczkowy i całkowy, PWN, Warszawa, 2008.
4. T. Jurlewicz, Z. Skoczylas, Algebra i geometria analityczna 1, GiS, Wrocław 2007.
Additional
1. Krysicki W., Włodarski L.: Analiza matematyczna w zadaniach. Część I PWN, Warszawa 2013.
2. Stankiewicz W.: Zadania z matematyki dla wyższych uczelni technicznych. Część I, PWN, Warszawa 2012.

3. M. Gewert, Z. Skoczylas, Analiza matematyczna 1, GiS, Wrocław 2012.

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,00
Classes requiring direct contact with the teacher	65	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	60	2,00