POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Algebra [S1Teleinf1>ALG]

Course

Field of study
Teleinformatics

Year/Semester
1/1

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
0

Other (e.g. online)
0

Tutorials
15

Projects/seminars
0

Number of credit points
3,00

Coordinators

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Lecturers

Prerequisites

High school level mathematical knowledge and the ability to use it in some specific practical situations

Course objective

To provide students with basic knowledge of algebra, in particular, about the field of complex numbers, linear algebra and some structures of abstract algebra. Developing abstract thinking skills, as well as the ability to apply the acquired knowledge in more practical issues

Course-related learning outcomes

Knowledge
Student has a knowledge of the basisc of linear and abstract algebra.
Skills
Student should know the basic methods of linear algebra and be able to illustrate the most important theorems and definitions with appropriate examples.
Social competences
Student should know the limitations of his own knowledge and understand the need to expand his skills. In addition, he should understand the need to be precise in expressing his thoughts and the

value of theoretical thinking

Methods for verifying learning outcomes and assessment criteria
Learning outcomes presented above are verified as follows:

.Lecture - test (with some possible exercises included) at the end of the semester.
Tutorials - test and assessment of activity in the classroom.

Programme content
Complex numbers; matrix calculus; linear systems; vector spaces; linear operators; diagonalization of matrices; groups and rings

Complex numbers via Hamilton's construction; de Moivre's formula; roots of complex polynomials; matrix calculus; Laplace expansion (cofactor expansion); Gauss' algorithm; vector space; basis and dimension of a vector space; linear operator; eigenvalues and eigenvectors; diagonalization; symmetries; group of permutations; group action; homomorphism; image and kernel of a homomorphism; rings; modular arithmetic; finite fields

Course topics
none

Teaching methods
Lectures: theory presented in relation to the students' current knowledge; initiating discussions frequently during the lecture; introducing new topics preceded by numerous examples and motivations; recommending materials for self-study and supplementing knowledge
Tutorials: tasks closely related to the theory presented during the lecture; solving example tasks on the blackboard; detailed reviewing of the solutions to the tasks by the teacher and discussion of the comments; taking into account the activity of students during classes when assigning the final grade.

Bibliography
Basic
[1] A. I. Kostrykin, Wstęp do algebry. Podstawy algebry, 2012.
[2] T. Jurlewicz i Z. Skoczylas, Algebra liniowa 1, 2003.
Additional
[1] M. Grzesiak, Liczby zespolone i algebra liniowa, 1999.
[2] J. Rutkowski, Algebra liniowa w zadaniach, 2008.

Breakdown of average student's workload

	Hours	ECTS
Total workload	56	3,00
Classes requiring direct contact with the teacher	30	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	26	1,00