POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

COURSE DESCRIPTION CARD - SYLLABUS

Course name

Mathematics

Course

Field of study	Year/Semester
Circular System Technologies	1/1
Area of study (specialization)	Profile of study
-	general academic
Level of study	Course offered in
First-cycle studies	polish
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
30	0	0
Tutorials	Projects/seminars	
30	0	

Number of credit points

6

Lecturers

Responsible for the course/lecturer:

M. Sc., Eng. Marcin Stasiak

marcin.stasiak@put.poznan.pl

Responsible for the course/lecturer:

dr Andrzej Drozdowicz

andrzej.drozdowicz@put.poznan.pl

Prerequisites

Student should have basic knowledge on the high school level.

Course objective

The aim of the subject is presentation of a basic knowledge of calculus, linear algebra, ordinary differential equations and selected topics in vector analysis and approximation theory. The scope of

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material is closely connected with other specialized courses and is going to allow student to comprehend analysed problems.

Course-related learning outcomes

Knowledge

1. Has general knowledge concerning basic ideas, rules and mathematical theories - K_W02
2. General knowledge concerning higher maths techniqes necessary to describe simple problems appearing in scientific and engineering problems - K_W02

Skills

1. Ability to analyse problem as well as to find their solutions based on known theorems and methods - K_U13

Social competences

1. Being concious of self-learning need for whole life - K_K01
2. Being concious of developing both, professional and personal competences - K_K01

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Oral and written exam from lecture part. Written tests within the term. The final grade is an average value of the both parts of the exam (oral and the written one).

Programme content

1. Linear algebra:
- complex numbers, algebraic, trigonometric and expotential form of complexs numbers, calculations
- vectors, matrices, determinants and their properties, vector and scalar product
- systems of linear equations and their applications
2. Calculus:
- sequences, recursion, monotonicity, convergence, limits
- functions, monotonicity, injective function, inverse function, elementary functions: polynomials, rational functions, logarithmic and expotential functions, trigonometric functions, cyclometric functions, hyperbolic functions and their inverses and properties
- limit of a function, continuity of a function, asymptotes
- the first and the second order derivative and its properties, monotonicity of a function, extreme points and inflection points, de L'Hospital theorem, chemical and physical interpretation of a derivative
- investigation of a function
- indefinite integral and its properties, chosen methods of integreation
- definite integral and its properties, chemical and physical interpretation of an definite integral

Teaching methods

Lecture: traditional form given on the blackboard with discussion
Lab classes: solving problems and exercises

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Bibliography

Basic

1. M. Lassak, Matematyka dla studiów technicznych, Wyd. Supremum, Warszawa 2014,

2. W. Krysicki, L. Włodarski, Analiza matematyczna w zadaniach cz. 1 i 2, PWN, Warszawa 2005

3. M. Gewert, Z. Skoczylas, Równania różniczkowe zwyczajne, GiS, Wrocław 2016

4. M. Gewert, Z. Skoczylas, Analiza matematyczna 1, GiS, Wrocław 2020

5. M. Gewert, Z. Skoczylas, Algebra i geometria analityczna, GiS, Wrocław 2020

Additional

1. E. Majchrzak, B. Mochnacki, Metody numeryczne, Wyd. Politechniki Śląskiej, Gliwice 2004

2. M. Gewert, Z. Skoczylas, Elementy analizy wektorowej, GiS, Wrocław 2004

3. E. Kasperska, A. Kasperski, B. Piątek, Przewodnik do ćwiczeń z algebry z elementami logiki matematycznej i teorii mnogości, Wyd. Politechniki Śląskiej, Gliwice 2016

Breakdown of average student's workload

	Hours	ECTS
Total workload	150	6,0
Classes requiring direct contact with the teacher	75	3,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	75	3,0

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[1] delete or add other activities as appropriate