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
Environmental Engineering	1/2
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		
Tutorials	Projects/seminars	
15		

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

Dr Małgorzata Zbąszyniak

Responsible for the course/lecturer:

Prerequisites

Knowledge of real function calculus. Calculations of derivatives and integrals of one variable functions. Student understands the need and cnows the possibility of studying, improving language skills, professional, personal and social skills.

Course objective

-The recognizing methods and applications of analytical geometry (vectors, lines in space, planes), mathematical analysis (calculus of funtions of several variables)and differential equations.

Course-related learning outcomes

Knowledge

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1. Methods of calculation and applications of multiple and line integrals to describe and analyze selected physical phenomenons.

2. Methods of solving differential equations.

3. The student explains the basic mathematical laws and explains conditions for their application.

Skills

1. The student uses the literature and also other sources of knowledge.

2. The student learns to calculate and apply multiple and line integrals to describe and analyze selected physical phenomenons.

Social competences

1. The sens of usefulness of mathematical competence in engineering practice.

2. The ability to work in a team.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

-LECTURE. A two-part written examination at the and of the semestr:

-sat.1 theoretic knowledge (30%);

-sat.2 applications in practical exercises (70%).

Duration of test: 90 minutes.

Classes: tests during the semestr (5x15 or 6x15 minutes).

Programme content

-Matrices end determinants, systems of linear equations.

-Vectors, the dot product, the vector product. Lines in space, planes, the paraboloid of revolution, cylinders and the axis of the cone.

-Gradient, directional derivative, tangent planes and normal lines to surfaces.

-Multiple integrals with applications.

-Ordinary differential equations (separable, exact, homogeneous, Bernoulli, first-order and second-order linear).

-Number series and power series.

Teaching methods

Lecture with presentation supplemented by examples given on the board. Interactive lectures with problems and questions for students. The activity of students is taken into account in valuation of them. Discussion during lectures is expected.

Connections with others mathematical subjects are indicated.

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Practical lessons. Solving of exemplary exercises on a blackboard. Discussion of solutions with relative comments.

Bibliography

Basic

1. W. Stankiewicz, J. Wojtowicz, Zadania z matematyki dla wyższych uczelni technicznych, PWN, część pierwsza i druga, Warszawa.

2. M. Gewert, Z.Skoczylas, Analiza matematyczna 2. Definicje, twierdzenia, wzory. Oficyna Wydawnicza GiS.

Additional

1. E. Swokowski, Calculus with analytic geometry, Prindle, Weber; Schmidt, Boston, Massachusetts

2. Dennis G.Zill, A first course in differential equations with applications, Prindle, Weber ; Schmidt, Boston.
3. W. Krysicki, L.Włodarski, Analiza matematyczna w zadaniach, PWN, Warszawa.

Breakdown of average student's workload

	Hours	ECTS
Total workload	90	4
Classes requiring direct contact with the teacher	50	2
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	40	2

[1]   delete or add other activities as appropriate

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