POZNAN UNIVERSITY OF TECHNOLOGY

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Mathematics [N1IŚrod2>Mat2]

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	Polish
Form of study	Requirements
part-time	compulsory

Number of hours

Lecture	Laboratory classes	Other
20	0	0
Tutorials	Projects/seminars	
30	0	

Number of credit points

5,00

Coordinators	Lecturers
dr Małgorzata Zbąszyniak malgorzata.zbaszyniak@put.poznan.pl	

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:
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;
-sat.2 applications in practical exercises.
Duration of test: 70 minutes.
Classes: tests during the semestr (3x30 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 secondorder linear).
-Number series and power series.

Course topics

Teaching methods

Traditional education:
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.
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	125	5,00
Classes requiring direct contact with the teacher	50	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	75	3,00