COURSE DESCRIPTION CARD - SYLLABUS

Course name

Mathematic

Course

Field of study	Year/Semester
Aerospace Engineering	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)
45	0	0
Tutorials	Projects/seminars	
45	0	

Number of credit points

6

Lecturers

Responsible for the course/lecturer:

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Faculty of Control, Robotics and Electrical Engineering

Institute of Mathematics

Responsible for the course/lecturer:

POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

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

Prerequisites

1. The basic mathematics of secondary school.

2. Logical thinking, learning with understanding, the use of textbooks.

3. Awareness of the purpose of learning and acquiring new knowledge.

Course objective

1. Getting to know the issues of algebra and geometry, differential and integral calculus and the possibility of their application in subjects directional.

Course-related learning outcomes

Knowledge

1. Has basic knowledge of mathematics including algebra, analysis, differential and integral calculus.

2. Defines the basic concepts in the field of mathematics considered.

Skills

1. He can apply differential and integral calculus in physics and mechanics.

2.Can, using mathematical concepts, describe simple processes and mechanical problems.

Social competences

1. He reliably acquires knowledge and acts honestly when verifying knowledge.

2.Understands the need for lifelong learning, can inspire others to learn.

3. Adheres to the principles of savoir-vivre.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Assessment on the basis of a written exam conducted during the exam session at the end of the semester. The assessment also takes into account the student's activity during classes.

Classes: assessment on the basis of 4 tests and activity in the classroom.

Programme content

Update 2019/2020

Complex numbers (algebraic, trigonometric, exponential, actions, Moivre's formula, Euler's formulas, 2nd order equations). Matrices and determinants (actions, properties). Systems of linear equations (Cramer's theorem, Kronecker-Capelli theorem). Geometry in three-dimensional space (actions on vectors and their properties). Functions of one variable (number sequences, monotonicity and boundary, Euler number, boundary and continuity of functions). Differential calculus of one variable function (derivation of a function, determination, interpretation, calculation, differential of function and its application, theorems on average value and their applications - function extremes, concavity and

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convexity, inflection points, de L'Hospital rule, function test). Indefinite integral (original function, integration of sum and product, integration by substitution and parts, integration of rational functions and non-measurable ones). Definite integral (determination, interpretation and relation to the field, properties, improper integrals, applications - calculation of flat area fields, curve arc length, volume and surface area of rotational solids).

Teaching methods

Applied learning methods: lectures and exercises.

At the lecture, the theory is supported by examples. The lecture is conducted in an interactive way with formulating questions towards students. Completed with self-solve tasks, which are verified and have an impact on the final grade.

The exercises provide for an example solution of the task on the board together with the analysis of subsequent stages. The method of solving the problem by the students on the blackboard is reviewed by the lecturer.

Bibliography

Basic

1. W. Krysicki, L. Włodarski, Analiza matematyczna w zadaniach, t. I, PWN, Warszawa 2006.

2. F. Leja, Rachunek różniczkowy i całkowy. Państwowe Wydawnictwo Naukowe, Warszawa 1978

3. I. Foltyńska, Z. Ratajczak, Z. Szafrański, Matematyka cz. I i II, Wydawnictwo Politechniki Poznańskiej, Poznań 2001.

Additional

1. . M. Gewert, Z. Skoczylas, Analiza matematyczna 1, Oficyna Wydawnicza GiS, Wrocław 2006.

2. . H. Jurlewicz, Z. Skoczylas, Algebra liniowa 1, Oficyna Wydawnicza GiS, Wrocław 2006.

3. Dennis G. Zill, Calculus with Analytic Geometry, Prindle,Weber & Schmidt, Boston 1985

Breakdown of average student's workload

	Hours	ECTS
Total workload	150	6,0
Classes requiring direct contact with the teacher	90	4,0
Student's own work (literature studies, preparation for tutorials, preparation for tests and the final exam) [1]	60	2,0

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[1] delete or add other activities as appropriate