STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Mathematics		**1010604111010340001**
Field of study: **Aerospace Engineering**	Profile of study (general academic, practical): **(brak)**	Year /Semester: **1 / 1**
Elective path/specialty: **-**	Subject offered in: **Polish**	Course (compulsory, elective): **obligatory**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time): **part-time**	
No. of hours: Lecture: **27** Classes: **27** Laboratory: **-** Project/seminars: **-**		No. of credits: **6**
Status of the course in the study program (Basic, major, other): **(brak)**	(university-wide, from another field): **(brak)**	
Education areas and fields of science and art: **the sciences** / **Mathematical sciences**		ECTS distribution (number and %): **6 100%** / **6 100%**

Responsible for subject / lecturer:

dr inż. Agnieszka Szawioła
email: agnieszka.szawiola@put.poznan.pl
tel. 61 665 2712
Faculty of Electrical Engineering
ul. Piotrowo 3A 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	The basic mathematics of secondary school.
2	**Skills**	Logical thinking, learning with understanding, the use of textbooks.
3	**Social competencies**	Awareness to learning and acquiring new knowledge.

Assumptions and objectives of the course:

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

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. has knowledge in the field of mathematics, including algebra, analysis, theory of differential equations, probabilistic, analytical geometry necessary for: description of the operation of discrete mechanical systems, understanding of computer graphics methods, description of the operation of electrical and mechatronic systems - [K1A_W01]

Skills:

1. He can describe the language of mathematics to describe simple problems in mechanics - [K1A_U01]

Social competencies:

1. understands the need to learn throughout life; can inspire and organize the learning process of other people - [K1A_K01]

Assessment methods of study outcomes

Lecture: Assessment on the basis of written examination conducted in the examination session at the end of the semester.

Exercises: evaluation based on the current control messages in the form of written tests and activity in class.

Course description

Update 2018/2019

Program content:

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 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). Differential calculus of functions of several variables - absolute differential.

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.

Basic bibliography:

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 bibliography:

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.

Result of average student's workload

Activity	Time (working hours)
1. Participation in the lecture	27
2. Fixing the content of the lecture	13
3. Participation in consultations	10
4. Preparation for the exam	20
5. Participation in the exam	2
6. Preparation for exercises	6
7. Participation in the exercises	27
8. Strengthening the content of exercises	20

Student’s workload

Source of workload	hours	ECTS
Total workload	125	6
Contact hours	66	4
Practical activities	39	2