STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Selected topics in Mathematics**		Code **1010601221010344271**

Field of study **Mechanical Engineering**	Profile of study (general academic, practical) **general academic**	Year /Semester **1 / 2**

Elective path/specialty **-**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**

Cycle of study: **First-cycle studies**	Form of study (full-time,part-time) **full-time**

No. of hours Lecture: **2** Classes: **1** Laboratory: **-** Project/seminars: **-**	No. of credits **4**

Status of the course in the study program (Basic, major, other) **other**	(university-wide, from another field) **university-wide**

Education areas and fields of science and art **the sciences** **Mathematical sciences**	ECTS distribution (number and %**)** **4 100%** **4 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic mathematics from upper secondary school.
2	**Skills**	Logical thinking, learning comprehension, using textbooks.
3	**Social competencies**	Awareness of the purpose of learning and acquiring new knowledge.

Assumptions and objectives of the course:

The goal of the course:

Acquainting with issues from algebra and geometry, differential and integral calculus and the possibility of applying them in the major subjects.

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. - [K1_W01]

Skills:

1. Can acquire information from literature, the internet, databases and other sources. Can integrate the information obtained and interpret conclusions and create and justify opinions - [K1_U01]

Social competencies:

1. He is ready to perform critical knowledge. - [K1_K01]

Assessment methods of study outcomes

-Lecture: Assessment based on the written exam conducted in the examination session after the end of the semester of study. The assessment also includes the student's activity during the classes.

Exercises: assessment based on 4 tests and activity in class.

Course description

Update 2018/2019

Program:

DIFFERENT CALCULUS OF FUNCTIONS OF SEVERAL VARIABLES (definition of the function of two variables, limits and continuity of the function of two variables, partial derivative, Schwarza theorem, a total differential, extreme of functions of two variables, derivative of a entangled function).

MULTIPLE INTEGRALS (normal area, double integral; evaluating, a iterated integral, reversing the order of integration, exchange of variables in the double integral - polar coordinates, the use of a double integral in geometry and mechanics - Cartesian and polar coordinates).

LINE INTEGRALS (not-directed line integral and of applying them in mechanics, directed line integrals, directed line integral independent of the path, directed line integrals along simple closed curve, Green's theorem, the area and work using the line integrals.

ORDINARY DIFFERENTIAL EQUATIONS (definition of ordinary differential equation, general, particular and singular solution, initial-value and boundary problem, differential equation with separated variables, first order linear differential equation; method of constant change, Bernoulli's differential equation, second order linear differential equation with real constant coefficients; the method of variation of parameters and undetermined coefficients.

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,II, 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, II,III, Wydawnictwo Politechniki Poznańskiej, Poznań 2001.

Additional bibliography:

1. M. Gewert, Z. Skoczylas, Analiza matematyczna 2, Oficyna Wydawnicza GiS, Wrocław 2006.

2. Dennis G. Zill, Calculus with Analytic Geometry, Prindle,Weber &Co; Schmidt, Boston 1985.

Result of average student's workload

Activity	Time (working hours)
1. Participation in the lecture	30
2. Fixing the content of the lecture	15
3. Participation in consultations	8
4. Preparation for the exam	15
5. Participation in the exam	2
6. Preparation for exercises	5
7. Participation in the exercises	15
8. Strengthening the content of exercises	15
9. Preparation for lecture	5

Student's workload

Source of workload	hours	ECTS
Total workload	110	4
Contact hours	55	2
Practical activities	55	2