STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Mathematics**		Code **1010101211010340004**
Field of study **Environmental Engineering First-cycle Studies**	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) **full-time**	
No. of hours Lecture: **45** Classes: **30** 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 **technical sciences**		ECTS distribution (number and %) **6 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge with range of secondary school.
2	**Skills**	The ability to associate facts, information processing, reasoning, interpretation and ability to reflect.
3	**Social competencies**	Student understands the need and cnows the possibility of studying, improving language skills, professional, personal and social skills.

Assumptions and objectives of the course:

-The recognizing methods and applications of mathematical analysis and linear algebra.

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

Knowledge:

1. The student explains the basic mathematical laws and explains conditions for their application. - [K_W02]
2. The student knows rules for finding derivative, indefinite and definite integrals and their applications. - [K_W01]

Skills:

1. The student uses the literature and also other sources of knowledge. - [K_U01]
2. The student uses calculus in calculations resulting from the needs of engineering practice. - [K_U10]
3. The student formulates simple conclusions on the basis of results. - [K_U01]

Social competencies:

1. The sens of usefulness of mathematical competence in engineering practice. - [K_K01]
2. The ability to work in a team. - [K_K03]

Assessment methods of study outcomes

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 (5x30 minutes).

Course description

Revision 2017

Applied methods of education: lectures and practical lessons.

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.

-Complex numbers.

-Elementary function and sequences of numbers.

-Differential and integral calculus.De L'Hospital rule. Trigonometric and rational integrals, partial fractions and quadratic expressions, miscellaneous substitutions. Areas, lenghts of curves, the area and the volumeof the surface of revolution obtained by revolving C about the x-axis. Mas, moments Mx and My and the center of mass. Integrals with infinite limits of integration.

-Functions ofseveral variables. Partial derivatives, differentials,extrema of functions of several variables.

-Matrices end determinants, systems of linear equations.

Basic bibliography:

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 1. Definicje, twierdzenia, wzory. Oficyna Wydawnicza GiS.

3. I. Foltyńska, Z. Ratajczak, Z. Szafrański, Matematyka część I i II, Wydawnictwo Politechniki Poznańskiej.

Additional bibliography:

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

2. W. Krysicki, L.Włodarski,Analiza matematyczna w zadaniach, PWN, Warszawa.

Result of average student's workload

Activity	Time (working hours)
1. Share in lectures	45
2. Share in classes	30
3. Preparing for classes and for written tests	60
4. Preparing for examination	35
5. Share in consultations. Examination period	10

Student's workload

Source of workload	hours	ECTS
Total workload	180	6
Contact hours	85	4
Practical activities	0	0