STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Mathematics		**1010321311010340025**
Field of study	Profile of study (general academic, practical)	Year /Semester
Electrical Engineering	**(brak)**	**1 / 1**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**obligatory**
Cycle of study:	Form of study (full-time,part-time)	
First-cycle studies	**full-time**	
No. of hours		No. of credits
Lecture: **60** Classes: **45** Laboratory: **-** Project/seminars: **-**		**7**
Status of the course in the study program (Basic, major, other)	(university-wide, from another field)	
(brak)	**(brak)**	
Education areas and fields of science and art		ECTS distribution (number and %)
technical sciences		**7 100%**
Technical sciences		**7 100%**

Responsible for subject / lecturer:

dr Marian Liskowski
email: marian.liskowski@put.poznan.pl
tel. (61)665 2842
Wydział Elektryczny
ul. Piotrowo 3A 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Knowledge of mathematics defined by the core curriculum of mathematics education at the advanced level of secondary school
2	**Skills**	The ability to associate facts, information processing, reasoning, interpretation and ability to reflect.
3	**Social competencies**	Focus on expanding knowledge and learn new skills in order to participate more fully in life and society.

Assumptions and objectives of the course:

1). Familiarize students with the methods of mathematical analysis, linear algebra in the section on complex numbers and matrix numbers and vector calculus and education skills to apply them to the analysis of the phenomena and problems in the field of engineering.

2). Developing skills related to finding information not directly expressed, finding connections between distributed information, inference on the basis of several factors.

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

Knowledge:

1. The student knows the formulas, graphs and properties of elementary functions. - [K_W01]
2. The student knows the concept of derivative of the function, geometric meaning of derivative of at the point, rules for finding dervative, the concept of indefinite integrals of functions, basic methods of integration of functions and geometric meaning of the definite integral function in the interval - [K_W01]
3. The student has knowledge about on arithmetical operations on complex numbers and matrices, and their applications. - [K_W01]

Skills:

1. The student analyzes the properties of the function using the concepts and methods provided by the calculus. - [K_U10]
2. The student uses calculus in the calculations resulting from the needs of engineering practice. - [K_U10]
3. The student builds a simple mathematical models of physical phenomena and processes. - [K_U10]
4. The student simulates, using carefully selected instruments calculus, selected physical processes, taking into account the extreme behavior. - [K_U10]

Social competencies:

1. The student is aware of the usefulness of mathematical competence in engineering practice. - [K_K01]
2. The student is able to reflect and critically assess their own achievements. - [K_K03]

Assessment methods of study outcomes

Lecture. A two-part written examination at the end of the semester:
- Sat. 1 knowledge test (3 questions)
- Sat. 2 test of skills (3 jobs).

Method of evaluation: Each of the two parts of the test is evaluated in a scoring system using a scale of 0-15 points.
Duration of test: 60 minutes.

TUTORIALS:
- 2 colloquia written during the semester (7 and 14 weeks), each rated on a scoring system,
- continuous evaluation for each course.

Course description

1). Elements of logic. Elements of set theory, the set of real numbers. The concept of the relationship (including equivalence relation, the relation of order and order linear relationship). The scalar function.
2). Elementary functions (formulas, graphs, properties).
3). The limit of a function and applications.
4). Differential calculus of one variable function with selected applications in engineering practice.
5). Integral calculus of one variable function with selected applications in engineering practice.
6). Series of numbers, the concept of convergence of the series. Convergence criteria.
7). Complex numbers, polynomials, algebraic equations (fundamental theorem of algebra).
8). Operations on matrices. Matrices and linear systems.
9). Vectors and solid analytic geometry (lines and planes).

Basic bibliography:

1. W. Żakowski, Matematyka, T.1 i T.2, WNT, Warszawa 2003.
2. M. Gewert, Z. Skoczylas, Analiza matematyczna 1 (Definicje, twierdzenia, wzory), Oficyna Wydawnicza GiS, Wrocław 2011.
3. T. Jurlewicz, Z. Skoczylas, Algebra liniowa 1, (Definicje, twierdzenia, wzory), Oficyna Wydawnicza GiS, Wrocław 2007.
4. W. Krysicki, L. Włodarski, Analiza matematyczna w zadaniach, T.1, T.2, PWN, Warszawa 2011.

Additional bibliography:

1. W. Stankiewicz, J. Wojtowicz, Zadania z matematyki dla wyższych uczelni technicznych, T.1, T.2, PWN, Warszawa 2003.
2. T. Jurlewicz, Z. Skoczylas, Algebra i geometria analityczna, Oficyna Wydawnicza GiS, Wrocław 2011.
3. I. Foltyńska, Z. Ratajczak, Z. Szafrański, Matematyka dla studentów uczelni technicznych, t. I, II i III, Wydawnictwo Politechniki Poznańskiej, Poznań 2004

Result of average student's workload

Activity	Time (working hours)
1. Preparing for classes	35
2. Preparing for written tests	20
3. Studying for exam	20

Student's workload

Source of workload	hours	ECTS
Total workload	180	7
Contact hours	105	4
Practical activities	0	0