

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Mathematical analysis and linear algebra		Code 1010331511010344953
Field of study Information 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) full-time	
No. of hours Lecture: 30 Classes: 15 Laboratory: - Project/seminars: -		No. of credits 5
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 %) 5 100% 5 100%
Responsible for subject / lecturer: Kamil Świątek, Ph.D. email: kamil.swiatek@put.poznan.pl tel. 61665-2816 Wydział Elektryczny ul. Piotrowo 3A, 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Student has basic knowledge of mathematics at the secondary level.
2	Skills	Student performs the elementary algebraic operations. Student solves simple equations and inequalities.
3	Social competencies	Student knows the limits of his own knowledge and understands the need for further education.
Assumptions and objectives of the course: The main goal is to acquaint a student with the basic concepts of higher mathematics. After the course the student will be able to: perform algebraic operations on complex numbers, find the limit of a given sequence, examine the convergence of a given series, plot graphs of the elementary functions, determine the limit of a given function, find the derivative of a given function, use the methods of curve analysis.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Student has basic knowledge in mathematics including selected sections of linear algebra and mathematical analysis - [K_W01]		
Skills:		
1. Student is able to obtain information from literature, databases and other sources of knowledge; student is able to: integrate the obtained information, make their interpretation, and draw conclusions as well as formulate and justify opinions - [K_U01]		
2. Student has the ability to self-education among others to improve professional competence - [K_U05]		
Social competencies:		
1. Student is aware of: the importance of behavior in a professional manner, the principles of professional ethics, the respect for the diversity of views and cultures - [K_K03]		
Assessment methods of study outcomes		

<p>Lectures: - a written exam - verification of knowledge and skills of its application to solving mathematical problems.</p> <p>Classes: - a written test - verification of the practical application of knowledge to solving mathematical problems.</p>		
Course description		
<p>Complex numbers - algebraic form of a complex number, geometric interpretation of a complex number, elementary operations performed on complex numbers, modulus of a complex number, trigonometric form of a complex number, de Moivre's formula, roots of complex numbers.</p> <p>Sequences of real numbers - boundedness of a sequence, monotonicity of a sequence, limit of a sequence, properties of sequences converging to finite and infinite limits, Euler's number.</p> <p>Series of real numbers - convergence of a series, nth-term test for divergence, convergence tests (comparison test, D'Alembert's criterion, Cauchy's criterion), alternating series test (Leibniz criterion).</p> <p>Elementary functions and limit of function - review of elementary functions, basic properties of functions, an inverse function, limit of a function, properties of functions converging to finite and infinite limits.</p> <p>Derivative of a function - geometric interpretation of derivative, rules of differentiation, basic properties of derivative of a function, higher-order derivatives.</p> <p>Application of derivatives to a curve analysis - local maxima and local minima of a function, monotonicity intervals, points of inflection, convexity and concavity intervals.</p> <p>Applied methods of education: - lectures - theory presented in connection with the current knowledge of students, - classes - solving of exercises on the blackboard.</p> <p>Update date: 02.09.2017</p>		
Basic bibliography:		
<ol style="list-style-type: none"> 1. T. Jurliewicz, Z. Skoczylas, Algebra liniowa 1: definicje, twierdzenia, wzory, Oficyna Wydawnicza GiS, Wrocław, 2007. 2. M. Gewert, Z. Skoczylas, Analiza matematyczna 1: definicje, twierdzenia, wzory, Oficyna Wydawnicza GiS, Wrocław, 2015. 3. M. Gewert, Z. Skoczylas, Analiza matematyczna 2: definicje, twierdzenia, wzory, Oficyna Wydawnicza GiS, Wrocław, 2012. 4. W. Kryszicki, L. Włodarski, Analiza matematyczna w zadaniach 1, Wydawnictwo Naukowe PWN, Warszawa, 2013. 		
Additional bibliography:		
<ol style="list-style-type: none"> 1. T. Jurliewicz, Z. Skoczylas, Algebra liniowa 1: przykłady i zadania, Oficyna Wydawnicza GiS, Wrocław, 2007. 2. M. Gewert, Z. Skoczylas, Analiza matematyczna 1: przykłady i zadania, Oficyna Wydawnicza GiS, Wrocław, 2015. 3. M. Gewert, Z. Skoczylas, Analiza matematyczna 2: przykłady i zadania, Oficyna Wydawnicza GiS, Wrocław 2014. 		
Result of average student's workload		
Activity	Time (working hours)	
1. Participation in lectures	30	
2. Participation in classes	15	
3. Preparation for each laboratories	30	
4. Preparation for the written exam	30	
5. Assessment classes	4	
6. The written exam	4	
7. Consultations	4	
Student's workload		
Source of workload	hours	ECTS
Total workload	117	5
Contact hours	57	2
Practical activities	15	1