

Course title Matematyka/Mathematics		ECTS code 7.2.0592	
Name of unit administrating study Faculty of Chemistry			
Studies			
Field of study	Type	Form	
Environmental Protection	Bachelor	Full-time studies	
Teaching staff Dr Danuta Jaruszewska-Walczak			
Forms of classes, the realization and number of hours		ECTS credits 8	
A. Forms of classes, in accordance with the UG Rector's regulations lecture, audytorium classes		classes - 75 h tutorial classes - 45 h student's own work - 80 h TOTAL: 200 h - 8 ECTS	
B. The realization of activities In-class learning			
C. Number of hours lecture 30 h, audytorium classes 45 h			
The academic cycle First year, winter semester			
Type of course obligatory		Language of instruction Polish	
Teaching methods Problem lecture Case studies		Form and method of assessment and basic criteria for evaluation or examination requirements	
		A. Final evaluation, in accordance with the UG study regulations Course completion (with a grade), exam	
		B. Assessment methods Test, written exam with open questions	
		C. The basic criteria for evaluation or exam requirements Results of exam and tests. Activity during classes.	
Required courses and introductory requirements none			
Aims of education Introduction of elementary definitions in differential and integral calculus and linear algebra; acquiring the ability to solve basic problems in this field			
Course contents Limits, continuous functions. Closed, open and connected sets. Weierstrass theorem and Darboux theorem. Derivatives and differential. Interpretations: velocity, acceleration, tangential, elasticity. Monotonicity, d'Hospital principle, Taylor formula, approximations. Local and global extrema, minimum and maximum of real functions on closed intervals. Indefinite and definite integrals, geometric interpretation. Differential calculus of multivariable functions. Gradient, Jacobian matrices, Hessian. directional derivatives. Local extrema, conditional extrema. Complex numbers. Vector space, basis, linear mappings, multilinear mappings. Matrices, determinants, range, Kronecker-Capelli theorem, method of Gauss elimination. Determinacy, Sylvester criterion.			

Bibliography of literature

A. Literature required to pass the course

- R. Kowalczyk, K. Niedziałowski, C. Obczyński, *Matematyka dla studentów i kandydatów na wyższe uczelnie*. Repetytorium, PWN.
- R. Kowalczyk, K. Niedziałowski, C. Obczyński, *Granice i pochodne. Metody rozwiązywania zadań*, PWN.
- R. Kowalczyk, K. Niedziałowski, C. Obczyński, *Całki. Metody rozwiązywania zadań*, PWN.
- P. Kajetanowicz, J. Wierzejewski, *Algebra z geometrią analityczną*, PWN.
- W. Krysicki, L. Włodarski, *Analiza matematyczna w zadaniach*. Część 1, PWN.

B. Extracurricular readings