

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Abstract algebra and general topology		Code 1010341521010344917
Field of study Mathematics	Profile of study (general academic, practical) (brak)	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: 2 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 the sciences		ECTS distribution (number and %) 6 100%
Responsible for subject / lecturer: Prof. dr hab. Ryszard Płuciennik email: ryszard.pluciennik@put.poznan.pl tel. 61 665 33 59 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge In domain of calculus, mathematical logic and set theory.
2	Skills	Using of calculus of logic sentences and quantifiers. Expressing in the language of the set theory. Familiarity with the notion of convergence and limit.
3	Social competencies	Understanding of limitation of own knowledge and motivation for further education.
Assumptions and objectives of the course: Deep knowledge in general topology to a degree which is necessary to study mathematics. Skills for noticing of topological structure in classical finite and infinite dimensional spaces. Understanding of the notion of continuity of functions in metric and topological spaces. Discernment of topological properties of subspaces of given topological space.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. understand the role and weight of a proof In mathematics, and importance of assumptions. - [K_W02] 2. present fundamental theorems of general topology and their proofs, Moreover, he will be familiar with examples illustrating concrete notions of topology and find counterexamples that are necessary to exclude some situations. - [K_W05] 3. Master a basic knowledge of general topology and understand connections of topology with other subjects of mathematics, in particular mathematical analysis. - [K_W07]		
Skills: 1. present in a clear manner in words and writing mathematical deduction, formulate theorems and definitions and use quantifiers and sentential calculus in proving theorems. - [K_U01 K_U02 K_U04] 2. Create a new mathematical objects by construction of quotient spaces, Cartesjan products and other methods. - [K_U05] 3. use (in different context) notions of convergence of sequences, limit of a sequence and a function, continuity of functions in various abstract objects. - [K_U10]		
Social competencies: 1. He is able to formulate precisely questions which lead to go deeply his own understanding of given problem or finding of missing elements of deduction. - [K_K02]		
Assessment methods of study outcomes		

<p>Lecture Valuation of knowledge and skills during oral and written exam.</p> <p>Practical Lessons Two large tests concerning an application of knowledge from the lectures in exercises (student can use his own notes) Systematic control of theoretical knowledge in form of short quizzes. Valuation of student answers during lessons. Valuation of activity during lessons.</p>		
Course description		
<p>Metric spaces. Examples of metric spaces. The notion of topology. Methods of imposing of topology in abstract sets. Quotient topology. Induced topology. Separation axioms. Connections between them. Continuity of functions in a topological space. Equivalent conditions to continuity of a function in metric spaces. Compactness and connectedness. Properties of compact sets. Continuous function defined on a compact set and its properties. Complete metric spaces. Banach fixed point theorem and its application to numerical solutions of differential and integral equations. Cantor theorem. Baire theorem and its application. Method of category.</p>		
Basic bibliography:		
<ol style="list-style-type: none"> 1. R. Engelking, Topologia ogólna, Wydawnictwo Naukowe PWN Warszawa 2012. 2. K. Jänich, Topologia, PWN Warszawa 1996 		
Additional bibliography:		
<ol style="list-style-type: none"> 1. K. Kuratowski, Wstęp do teorii mnogości i topologii, Wydawnictwo Naukowe PWN Warszawa 2004 		
Result of average student's workload		
Activity	Time (working hours)	
Student's workload		
Source of workload	hours	ECTS
Total workload	150	6
Contact hours	30	6
Practical activities	30	6