

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Elements of general topology		Code 1010341751010349400
Field of study Mathematics in Technology	Profile of study (general academic, practical) general academic	Year /Semester 3 / 5
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) elective
Cycle of study: First-cycle studies (Polish Qualifications Framework level six)	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 30 Classes: 30 Laboratory: - Project/seminars: -	No. of credits 4	
Status of the course in the study program (Basic, major, other) Basic	(university-wide, from another field) University-wide	
Education areas and fields of science and art The sciences Mathematical sciences	ECTS distribution (number and %) 4 100% 4 100%	
Responsible for subject / lecturer: prof. dr hab. Ryszard Pluciennik email: ryszard.pluciennik@put.poznan.pl tel. 61 665 33 20 Faculty of Electrical Engineering ul. Piotrowo 3A 60-965 Poznań		Responsible for subject / lecturer: prof. dr hab. Ryszard Pluciennik email: ryszard.pluciennik@put.poznan.pl tel. 61 665 33 20 Faculty of Electrical Engineering ul. Piotrowo 3A 60-965 Poznań
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge from advanced calculus, mathematical logic, set theory and linear algebra. [K_W01 (P6S_WG)]
2	Skills	Skills in using of propositional calculus and calculus of quantifiers, language of set theory and notions of convergence. [K_U01 (P6S_UW)], [K_U13 (P6S_UW)]
3	Social competencies	Understanding of limitation of own knowledge and motivation for further education. [K_K01 (P6S_KK)], [K_K02 (P6S_KK)], [K_K05 (P6S_KK)]
Assumptions and objectives of the course: To get general topology under control in necessary state for study of mathematics. Understanding of the relation of affine, metric topological classification. Creating of a look at calculus from topological point of view.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: A student has deep and wide knowledge in topology and its applications and connections with another fields of mathematics, as mathematical analysis or functional analysis. He understands the role and significance of a mathematical proof, as well, as the role of assumptions. - [K_W01 (P6S_WG)]		
Skills: 1. A student is familiar with basic theorems occurred in studied areas of mathematics, he understands the role of mathematics in the development civilization and its applications. A student understands structure of mathematical theories and structure of mathematical proof, he is able to use logical formalism in order to build and to analyse the simple mathematical models describing phenomena of various scientific disciplines. He can also present his knowledge in a clear and precise way. - [[K_U01 (P6S_UW)] 2. The student is able to use English (or in another foreign language) mathematical literature - [K_U13 (P6S_UW)]		
Social competencies: 1. A student is aware in his knowledge in the area of mathematical sciences. He is able to formulate a problem precisely and try to solve it. - [K_K01 (P6S_KK)] 2. A student is able search out some information In literature (also English), by oneself. - [K_K02 (P6S_KK)]		

Assessment methods of study outcomes		
<p>Lecture Valuation of knowledge and skills during oral and written exam.</p> <p>Practical Lessons One large tests concerning an application of knowledge from the lectures in exercises. 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>Revised 2018</p> <p>Applied methods of education: lectures and practical lessons.</p> <p>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.</p> <p>Practical lessons. Solving of exemplary exercises on a blackboard. Discussion of solutions with relative comments.</p> <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>		
<p>Basic bibliography:</p> <p>1. R. Engelking, Topologia ogólna, Wydawnictwo Naukowe PWN Warszawa 2012. 2. K. Jänich, Topologia, PWN Warszawa 1996.</p>		
<p>Additional bibliography:</p> <p>1. K. Kuratowski, Wstęp do teorii mnogości i topologii, Wydawnictwo Naukowe PWN Warszawa 2004</p>		
Result of average student's workload		
Activity	Time (working hours)	
1. Taking part in lectures (15x5 h.)	30	
2. Taking part in practical lessons (15x5 h.)	30	
3. Preparing for practical lessons	15	
4. Preparing for tests	15	
5. Preparing for the exam and taking part in it	20	
6. Consultations	4	
Student's workload		
Source of workload	hours	ECTS
Total workload	114	4
Contact hours	66	2
Practical activities	48	1