

Subject card

Subject name and code	Topology I, PG_00155410						
Field of study	Mathematics						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		6.0		
Learning profile	academic		Assessment form		exam		
Conducting unit	Institute of Mathematics -> Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Rafał Filipów				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	30.0	0.0	0.0	0.0	60
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	60		10.0		80.0	150
Subject objectives	The aim of the course is to familiarize the student with the basic concepts of the theory of metric spaces.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[MATL3_K02] is ready to precisely formulate questions to deepen his/her own understanding of a given topic or to find missing elements of reasoning	Is ready to formulate precise questions that serve to deepen one's understanding of a given topic or to find missing elements of reasoning.	[SK8] observation of student's independent or team work
	[MATL3_W07] knows and understands selected concepts, methods and theorems of topology, as well as basic examples illustrating specific concepts in this field and enabling the refutation of erroneous hypotheses or unauthorized reasoning	Knows and understands the basic concepts, theorems, and methods of the theory of metric spaces.	[SW4] test/exam - oral or written
	[MATL3_U08] is able to formulate definitions and theorems in an understandable way, both orally and in writing, and present correct mathematical reasoning regarding the acquired issues	Verifies basic properties and proves simple facts about metric spaces and transformations between such spaces.	[SU4] test/exam - oral or written
	[MATL3_W09] knows and understands the role and importance of proof in mathematics, as well as the concept of the importance of assumptions	Knows and understands the basic concepts, theorems, and methods of the theory of metric spaces.	[SW4] test/exam - oral or written
	[MATL3_W08] knows and understands the structure of mathematical theories, is able to use mathematical formalism to build and analyze simple mathematical models in other fields of science	Knows and understands the basic concepts, theorems, and methods of the theory of metric spaces.	[SW4] test/exam - oral or written
	[MATL3_K09] is ready to critically evaluate arguments, find gaps in reasoning and constructively criticize other people's reasoning	Is prepared to critically evaluate arguments, find gaps in reasoning, and constructively criticize the reasoning of others.	[SK8] observation of student's independent or team work
	[MATL3_K06] is ready to formulate opinions on basic mathematical issues	Is ready to form opinions on basic mathematical issues.	[SK8] observation of student's independent or team work
	[MATL3_K01] is ready to accept the limitations of his/her own knowledge and understands the need for further education	Is willing to acknowledge the limitations of his own knowledge and is willing to pursue further education.	[SK8] observation of student's independent or team work
	[MATL3_U07] is able to correctly use the acquired concepts of topology, is able - at a simple and medium level of difficulty - to apply the known theorems and methods of this field and is able to interpret the obtained results	Verifies basic properties and proves simple facts about metric spaces and transformations between such spaces.	[SU4] test/exam - oral or written
	[MATL3_U09] is able to plan how to solve a specific problem and prepare a correct record of this solution, providing strict and precise justification for the correctness of his reasoning	Verifies basic properties and proves simple facts about metric spaces and transformations between such spaces.	[SU4] test/exam - oral or written
	[MATL3_K04] is ready to understand and appreciate the importance of intellectual honesty in one's own and other people's actions; is willing to act ethically	Is ready to understand and appreciate the importance of intellectual honesty in one's own and other people's actions; ethical conduct.	[SK8] observation of student's independent or team work
Subject contents	1. Metric and metric space 2. Limit of a sequence in metric space 3. Open and closed sets in metric space 4. Continuous maps of metric spaces 5. Complete spaces 6. Connected spaces 7. Compact spaces 8. Separable spaces		
Prerequisites and co-requisites			

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	tests	51.0%	50.0%
	observation of the student's attitude	51.0%	0.0%
	egzam	51.0%	50.0%
Recommended reading	Basic literature	1. R. Engelking, General Topology	
	Supplementary literature	1. W. Sutherland Introduction to Metric and Topological Spaces	
	eResources addresses		
Example issues/ example questions/ tasks being completed	1. Write the definitions of a metric and a limit of a sequence in a metric space. 2. Prove that sequences in a metric space have at most one limit. 3. Write the definitions of a Cauchy sequence and a complete space. 4. Prove the Banach fixed point theorem.		
Work placement	Not applicable		

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