University of Gdańsk

Subject card

Subject name and code	Topology I, PG_00188874		
Field of study	Mathematics		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2027/2028
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	8.0
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	45.0	45.0	0.0	0.0	0.0	90

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	90	4.0	106.0	200

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_U07] is able to correctly use the concepts of metric topology, is able to apply the theorems and methods of these fields 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_U08] can formulate definitions and theorems in an understandable manner, both orally and in writing, and present correct mathematical reasoning on the learned topics	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_W07] knows and understands at an advanced level selected concepts, methods and theorems of metric topology as well as basic examples both illustrating specific concepts in this field and allowing to refute false hypotheses or invalid reasoning	Zna i rozumie podstawowe pojęcia, twierdzenia i metody teorii przestrzeni metrycznych.	[SW4] test/exam - oral or written

<table>
<tr><td>Subject contents</td><td>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</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>egzam</td><td>51.0%</td><td>50.0%</td></tr>
<tr><td>tests</td><td>51.0%</td><td>50.0%</td></tr>
<tr><td>observation of the student's attitude</td><td>51.0%</td><td>0.0%</td></tr>
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</td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. R. Engelking, General Topology</td></tr>
<tr><td>Supplementary literature</td><td>1. W. Sutherland Introduction to Metric and Topological Spaces</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>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.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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