

Subject card

Subject name and code	Applications of set theory in real functions and topology, PG_00170081						
Field of study	Mathematics						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
Education level	Master's studies		Subject group		Optional subject group		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		5.0		
Learning profile	academic		Assessment form		credit		
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	0.0	0.0	0.0	0.0	30.0	30
	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	30		5.0		90.0	125
Subject objectives	The aim is to prepare students to write a master's thesis.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[MATMU2_K06] is ready to formulate opinions on basic mathematical issues	The student is able to formulate opinions on mathematical issues.	[SK1] oral statement/conversation/discussion
	[MATMU2_U09] can prepare oral presentations in-depth in Polish and at least one foreign language, in a selected field of mathematics	The student is able to prepare a paper and present it on a given topic.	[SU2] presentation/project/paper/report
	[MATMU2_W07] knows and understands the basic legal and ethical conditions related to scientific and teaching activities	The student acquires knowledge about copyright and intellectual property.	[SW1] oral statement/conversation/discussion
	[MATMU2_U02] can express mathematical content in speech and writing, in mathematical texts of various nature	The student is able to express mathematical content orally and in writing in mathematical texts.	[SU2] presentation/project/paper/report
	[MATMU2_U05] can perform proofs in a selected field and, if necessary, also use tools from other areas of mathematics	The student is able to apply the methods of a selected field of mathematics in argumentation and proof.	[SU2] presentation/project/paper/report
	[MATMU2_W03] knows and understands in-depth a selected field of theoretical or applied mathematics and is able to understand the formulations of issues in this field that are still at the research stage and knows the connections of issues in this field with other areas of mathematics	The student has in-depth theoretical knowledge of results and arguments in a chosen field of mathematics.	[SW2] presentation/project/paper/report
	[MATMU2_K02] is ready to precisely formulate questions to deepen his/her understanding of a given topic or find missing elements of reasoning	The student is able to precisely formulate questions that serve to deepen understanding of a given topic.	[SK1] oral statement/conversation/discussion
	[MATMU2_K04] is ready to understand and appreciate the importance of intellectual honesty in one's own and other people's actions; ethical conduct	The student understands and appreciates the importance of intellectual honesty.	[SK8] observation of student's independent or team work
	[MATMU2_U04] is able, at an advanced level and including modern mathematics, to apply and present, orally and in writing, methods of at least one selected branch of mathematics	The student is able to apply and present methods of a selected branch of mathematics at an advanced level	[SU2] presentation/project/paper/report
	[MATMU2_U07] is able to define his/her interests and develop them; in particular, is able to establish contact with specialists in his/her field, e.g. understand their lectures intended for young mathematicians	The student is able to identify his/her interests in mathematical discussions.	[SU1] oral statement/conversation/discussion
	[MATMU2_U03] can understand mathematical texts of various types from selected fields of mathematics	The student acquires the ability to understand mathematical texts in a selected field of mathematics at an advanced level.	[SU2] presentation/project/paper/report
	[MATMU2_U08] is able to prepare in-depth written works in Polish and at least one foreign language in a selected field of mathematics	The student is able to prepare a presentation on a given topic in writing.	[SU2] presentation/project/paper/report
	[MATMU2_K01] is willing to acknowledge the limitations of his or her own knowledge and is willing to pursue further education	The student knows the limitations of his or her own knowledge and demonstrates readiness for further education.	[SK8] observation of student's independent or team work
	[MATMU2_K05] is ready to independently search for information in literature, also in foreign languages	The student is able to independently search for information in professional literature.	[SK2] presentation/project/paper/report
Subject contents	• Applications of set theory to real functions. • Applications of set theory to topology. • Applications of set theory to measure theory. • Applications of set theory to combinatorics. • Applications of set theory to dynamical systems.		
Prerequisites and co-requisites			

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	observation of the student's attitude	100.0%	0.0%
	presentation	51.0%	100.0%
Recommended reading	Basic literature	• K. Ciesielski, Set Theory for the Working Mathematician. • A. Kechris, Classical Descriptive Set Theory. • S. Srivastava, A Course on Borel sets.	
	Supplementary literature	• Just, M. Weese, Discovering Modern Set Theory.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	not applicable		
Work placement	Not applicable		

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