

Subject card

Subject name and code	Introduction to Measure Theory, PG_00204254						
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 Subject group related to scientific research 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			5.0		
Learning profile	academic	Assessment form			exam		
Conducting unit							
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		3.0		62.0	125
Subject objectives	The aim of the course is to familiarize students with the basic concepts of measure and integral theory.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	[MATL3_U06] can formulate definitions and theorems in an understandable manner, both orally and in writing, and present correct mathematical reasoning on the learned topics		Can formulate and prove selected theorems concerning measures and integrals as well as measurable mappings.			[SU4] test/exam - oral or written	
	[MATL3_U02] is able to correctly use the concepts of mathematical analysis, differential equations and measure theory, is able to apply the theorems and methods of these fields and is able to interpret the obtained results		Can apply selected theorems concerning measures and integrals as well as measurable mappings.			[SU4] test/exam - oral or written	
	[MATL3_W02] knows and understands at an advanced level selected concepts, methods and theorems of mathematical analysis, differential equations and measure theory, as well as basic examples both illustrating specific concepts in this field and allowing to refute false hypotheses or invalid reasoning		Knows and understands the selected concepts, theorems and methods of measure and integral theory.			[SW4] test/exam - oral or written	
	[MATL3_W07] knows and understands at an advanced level the role and importance of proof in mathematics, as well as the concept of the importance of assumptions		Knows and understands the proofs of selected theorems of measure and integral theory.			[SW4] test/exam - oral or written	

Subject contents	<ol style="list-style-type: none"> 1. Measure space 2. Measure generated by outer measure 3. Lebesgue measure 4. Measurable functions 5. Lebesgue integral 		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	observation of the student's attitude	51.0%	0.0%
	egzam	51.0%	50.0%
	tests	51.0%	50.0%
Recommended reading	Basic literature	1. D. Cohn Measure Theory	
	Supplementary literature	1. P. Halmos, Measure theory, Springer 1974	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Write the definition of the σ-algebra of sets and the definition of a measure on a σ-algebra. 2. Prove that every measure is sigma-subadditive 3. Write the definitions of the Lebesgue integral of a non-negative direct function, a non-negative function, and any function. 4. Prove Lebesgue's theorem on the integration of a bounded sequence 		
Work placement	Not applicable		

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