University of Gdańsk

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	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	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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