

Subject card

Subject name and code	Differential Geometry for Physicists, PG_00182567						
Field of study	Physics						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2026/2027		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study Optional subject group 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	3		Language of instruction		Polish		
Semester of study	5		ECTS credits		6.0		
Learning profile	academic		Assessment form		credit		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr Denis Dobkowski-Ryłko				
	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		0.0		65.0	125
Subject objectives	The aim of the course is to introduce students to the fundamental concepts and theorems of differential geometry, with particular emphasis on topics relevant to theoretical physics. The course is intended to provide the mathematical preparation necessary for the study of field theory, special and general relativity, as well as to establish a solid foundation for further exploration of modern geometric and physical theories.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
Subject contents	• Elements of linear algebra and topology • Differentiable manifolds • Tangent space and tangent bundle • Vector fields and forms • Submanifolds • Vector bundles • Tensor analysis • Lie derivative • Covariant derivative • Theory of connections						
Prerequisites and co-requisites	Passed exam in Mathematical Analysis for Physicists and Algebra						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Midterm		51.0%		50.0%		
	Exam		51.0%		50.0%		
Recommended reading	Basic literature		Foundations of Differential Geometry, Vol. 1, Shoshcichi Kobayashi, Katsumi Nomizu				

	Supplementary literature	J.M. Lee, Manifolds and Differential Geometry, Graduate Studies in Mathematics, vol 107 Visual Differential Geometry and Forms: A Mathematical Drama in Five Acts, T. Needham
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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