

。 GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Outbin standard and	Linear algebra with geometry, PG, 00034519							
Subject name and code	Linear algebra with geometry, PG_00034519							
Field of study								
Date of commencement of studies	October 2023		Academic year of realisation of subject			2023/2024		
Education level	first-cycle 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	1		Language of instruction			Polish		
Semester of study	2		ECTS credits			5.0		
Learning profile	general academic profile		Assessment form			exam		
Conducting unit	Department Of Probability Theory And Biomathematics -> Faculty Of Applied Physics And Mathematics -> Wydziały Politechniki Gdańskiej							
Name and surname	Subject supervisor		dr Maciej Kuna					
of lecturer (lecturers)	Teachers	dr Maciej Kur						
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM
of instruction	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 S		SUM
	Number of study hours	60		5.0		60.0		125
Subject objectives	Getting to know the b	asic knowledge	e in the field of	linear algebra	and ana	alytic ge	ometry.	
Learning outcomes	Course out	Subject outcome Method of verification						
	[K6_W03] Has systematized knowledge of higher mathematics, including algebra, analysis, probability theory and numerical methods, allowing for basic description, understanding and modelling of physical phenomena and some technical processes.		Student has basic knowledge in the field of linear algebra and analytical geometry; knows complex numbers, matrix calculus, vector algebra. He knows different methods of solving problems with complex numbers, matrices, solving systems of linear equations and methods of analytic geometry in space R ^ 3, in the scope necessary in the work of an engineer.			[SW1] Assessment of factual knowledge		
	[K6_U01] Can learn independently, obtain information from literature, databases and other properly selected sources.		A student understands the value independent development of knowledge. He independently solves exercises that consolidate knowledge.		[SU2] Assessment of ability to analyse information			
Subject contents	1. Definition of group and homomorphizm of groups. Examples. 2. Definition of field, ring and homomorphizm of fields. Examples. 3. Field of complex numbers. 4. Definition of linear space. Linear independence. Basis. 5. Basic constructions in linear space. 6. Linear space of matrices. Determinant and rank of matrices. 7. Homomorphisms of linear spaces - linear operators. 8. Matrix of linear operator. 9. Linear problems. Kronecker-Capelli theorem. 10. Invariants of automorphisms of linear spaces. 11. Inner product spaces. 12. Unitary and hermitian operators. 13. Affine spaces. 14. R^n as affine space. 15. Quadric surfaces.							
Prerequisites and co-requisites	basic knowledge of n		ule field of seco	undary school.				

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade			
	exercises	50.0%	6.0%			
	egzamination	50.0%	40.0%			
	colloquia	50.0%	54.0%			
Recommended reading	Basic literature	J.Komorowski: Od liczb zespolonych do tensorów, spinorów, algebr Liego i kwadryk. PWN Warszawa 1978R.S. Ingarden L. Górniewicz: Algebra liniowa dla fizyków. Wydawnictwo Naukowe Uniwersytetu Mikołaja Kopernika Toruń 2000B. Gleichgewicht: Algebra. Oficyna Wydawnicza GiS Wrocław 2004				
	Supplementary literature	Vydawnictwo Politechniki Gdańskiej owski: Algebra i geometria afiniczna vo-Techniczne warszawa 1983				
	eResources addresses	Adresy na platformie eNauczanie: Algebra liniowa z geometrią 2024 - https://enauczanie.pg.edu.pl/moodl	Moodle ID: 37586 e/course/view.php?id=37586			
Example issues/ example questions/ tasks being completed	Definition of linear space and examples. Theorem of Kronecker- Capelli					
Work placement	Not applicable					

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