GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematical methods of physics and technics II, PG_00037303		
Field of study	Technical Physics		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2024/2025
Education level	first-cycle studies	Subject group	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	2	Language of instruction	Polish
Semester of study	4	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Atomic, Molecular and Optical Physics -> Faculty of Applied Physics and Mathematics		
Name and surname of lecturer (lecturers)	Subject supervisor		
	Teachers		

Lesson types and methods of instruction

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	5.0	35.0	100

Subject objectives

Acquaint students with mathematical methods of physics and technology.

Learning outcomes

Course outcome	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.	Students are familiar with selected mathematical methods used in physics and technology.	[SW1] Assessment of factual knowledge
[K6_U02] Can analyze and solve simple scientific and technical problems, based on possessed knowledge, using analytical, numerical, simulation and experimental methods.	Students know how to apply selected mathematical methods in description of physical processes.	[SU4] Assessment of ability to use methods and tools

Subject contents	1. The Dirac delta. 2. Matrix eigenvalue problems. 3. Sturm-Liouville problems. 4. The Green's function of a self-adjoint differential operator. 5. The generalized Green's function of a self-adjoint differential operator. 6. Applications of Green's functions. 7. Introduction to functions of a complex variable functions. 8. The Cauchy-Riemann conditions. 9. Complex sequences and series. 10. Contour integrals of complex functions. 11. The Cauchy-Goursat integral theorem. 12. The Cauchy integral formula. 13. The Taylor series of a complex function. 14. The Laurent series of a complex function. 15. Residuum of a complex function. 16. Evaluation of contour integrals by residues. 17. Evaluation of real definite integrals by residues. 18. Summation of series by residues.
Prerequisites and co-requisites	

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Grade of exercises (2 control works)	37.5%	50.0%
Grade of exam	50.0%	50.0%

Recommended reading

Basic literature	G. B. Arfken, H. J. Weber, Mathematical methods for physicists, 5th ed., Academic, San Diego, 2001
Supplementary literature	None.
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	1. Finding of eigenvalues and eigenvectors of given matrices. 2. Finding Green's functions for given differential operators. 3. Applications of the residuum theorem.

Work placement	Not applicable