

Subject card

Subject name and code	Seminar - solving maths problems for maths teachers, PG_00178990						
Field of study	Mathematics						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2026/2027		
Education level	Bachelor's studies		Subject group				
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		exam		
Conducting unit	Division of Didactics of Mathematics -> Institute of Mathematics -> Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Elżbieta Mrożek				
	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		10.0		80.0	150
Subject objectives	Deepening and broadening students knowledge of school mathematics.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[MATL3_K01] is ready to accept the limitations of his/her own knowledge and understands the need for further education	Student understands the need for continued education.	[SK8] observation of student's independent or team work
	[MATL3_U08] is able to formulate definitions and theorems in an understandable way, both orally and in writing, and present correct mathematical reasoning regarding the acquired issues	Student is able to formulate definitions, theorems, and mathematical arguments related to the content of the upper-secondary education stage, as well as independently solve mathematical problems at this level.	[SU1] oral statement/conversation/discussion [SU4] test/exam - oral or written [SU8] observation of student's independent or team work
	[MATL3_U09] is able to plan how to solve a specific problem and prepare a correct record of this solution, providing strict and precise justification for the correctness of his reasoning	Student is able to solve complex mathematical problems included in the upper-secondary school core curriculum, formulate mathematically sound arguments, and produce a clear and rigorous written solution.	[SU1] oral statement/conversation/discussion [SU4] test/exam - oral or written [SU8] observation of student's independent or team work
	[MATL3_W09] knows and understands the role and importance of proof in mathematics, as well as the concept of the importance of assumptions	Student solves problem-solving tasks and conducts mathematical proofs.	[SW4] test/exam - oral or written [SW1] oral statement/conversation/discussion
	[MATL3_K06] is ready to formulate opinions on basic mathematical issues	Student is able to formulate opinions on fundamental mathematical concepts.	[SK1] oral statement/conversation/discussion
	[MATL3_K04] is ready to understand and appreciate the importance of intellectual honesty in one's own and other people's actions; is willing to act ethically	Student analyses proofs of mathematical theorems and is able to use them to solve problems at the upper-secondary education level.	[SK1] oral statement/conversation/discussion [SK6] demonstration of practical skills
	[MATL3_K02] is ready to precisely formulate questions to deepen his/her own understanding of a given topic or to find missing elements of reasoning	Student is able to formulate questions that deepen their understanding of a given topic.	[SK4] test/exam - oral or written [SK6] demonstration of practical skills [SK8] observation of student's independent or team work
Subject contents	1. Mathematics within the integral process of education. 2. Development of elementary mathematical concepts and methods of introducing students to the practice of defining. 3. Teaching mathematics through problem-based and realistic approaches, including the analysis and solution of word problems. 4. Types of reasoning: empirical, inductive, and formal. 5. Problemsolving tasks related to key topics taught at the extended level in uppersecondary school. 6. Mathematical reasoning and proofs. 7. Solving and constructing examination tasks at the extended level of the uppersecondary education stage.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Activity	51.0%	20.0%
	exam	51.0%	50.0%
	test	51.0%	30.0%
	observation	51.0%	0.0%

Recommended reading	Basic literature	1. A. Birkholc, Analiza matematyczna dla nauczycieli, PWN. 2. W. Żakowski, Matematyka dla kandydatów na wyższe uczelnie 3. G. Półka, Jak to rozwiązać?, PWN, 1964 4. Collections of extendedlevel mathematics examination tasks (matura). 5. Collections of tasks and school textbooks.
	Supplementary literature	M. Szurek, O nauczaniu matematyki, GWO, 2005
	eResources addresses	
Example issues/ example questions/ tasks being completed	Write down the statement and prove the following theorems: Relationships between means (proofs for two numbers) Properties of the binomial theorem Change of base formula for logarithms Formulas for the roots of a quadratic equation, the coordinates of the vertex of a parabola, and Viètes formulas Bézouts theorem Theorem on segments in a right triangle Pythagorean theorem and the converse of the Pythagorean theorem Angle bisector theorem Three selected formulas for the area of a triangle Law of cosines and law of sines Formulas for the sine and cosine of a sum of angles Theorem on a cyclic quadrilateral and a tangential quadrilateral In a given/depicted solid, mark: the appropriate angle and the described crosssection; describe which solid is obtained by rotating the given figure about a certain axis.	
Work placement	Not applicable	

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