

Subject card

Subject name and code	Seminar - solving maths problems for maths teachers, PG_00174492						
Field of study	Mathematics						
Date of commencement of studies	October 2025		Academic year of realisation of subject			2025/2026	
Education level	Master's studies		Subject group			Optional subject group	
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			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
	[MATMU2_U07] is able to define his/her interests and develop them; in particular, is able to establish contact with specialists in his/her field, e.g. understand their lectures intended for young mathematicians	Analyzes mathematical proofs and applies them to solve tasks from the fourth stage of education (with an increased level of difficulty)	[SU4] test/exam - oral or written [SU8] observation of student's independent or team work
	[MATMU2_K04] is ready to understand and appreciate the importance of intellectual honesty in one's own and other people's actions; ethical conduct	Acts ethically, works independently on assigned tasks if required, especially on tests verifying the knowledge acquired.	[SK1] oral statement/conversation/discussion [SK8] observation of student's independent or team work
	[MATMU2_U03] can understand mathematical texts of various types from selected fields of mathematics	Analyses proofs of mathematical theorems and is able to use them to solve tasks at the fourth stage of education.	[SU1] oral statement/conversation/discussion [SU6] demonstration of practical skills
	[MATMU2_W02] knows and understands well the role and importance of the construction of mathematical reasoning	Can use mathematical formalism to create simple mathematical models.	[SW4] test/exam - oral or written [SW1] oral statement/conversation/discussion
	[MATMU2_W01] knows and understands in-depth the theory of selected areas of mathematics	Proves the truth of simple and moderately difficult theorems.	[SW4] test/exam - oral or written
	[MATMU2_W03] knows and understands in-depth a selected field of theoretical or applied mathematics and is able to understand the formulations of issues in this field that are still at the research stage and knows the connections of issues in this field with other areas of mathematics	Can use mathematical formalism to create simple mathematical models.	[SW1] oral statement/conversation/discussion
	[MATMU2_K05] is ready to independently search for information in literature, also in foreign languages	Analyzes the literature on reasoning in school teaching	[SK1] oral statement/conversation/discussion [SK6] demonstration of practical skills
	[MATMU2_K01] is willing to acknowledge the limitations of his or her own knowledge and is willing to pursue further education	Understands the need for further education.	[SK8] observation of student's independent or team work
	[MATMU2_U01] can construct mathematical reasoning: prove theorems and refute hypotheses through construction and selection of counterexamples	Solves problem-solving tasks and performs mathematical proofs	[SU4] test/exam - oral or written [SU6] demonstration of practical skills [SU8] observation of student's independent or team work
	[MATMU2_K02] is ready to precisely formulate questions to deepen his/her understanding of a given topic or find missing elements of reasoning	Is able to formulate questions that serve to deepen one's 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
	[MATMU2_U06] is able to apply methods and examples from a selected field of mathematics in related fields	Understands the importance of mathematics in other fields of science.	[SU4] test/exam - oral or written [SU6] demonstration of practical skills
	[MATMU2_K06] is ready to formulate opinions on basic mathematical issues	Is able to formulate opinions on basic mathematical issues	[SK1] oral statement/conversation/discussion
	[MATMU2_U05] can perform proofs in a selected field and, if necessary, also use tools from other areas of mathematics	Understands the importance of mathematics in other fields of science.	[SU4] test/exam - oral or written [SU8] observation of student's independent or team work
	[MATMU2_U04] is able, at an advanced level and including modern mathematics, to apply and present, orally and in writing, methods of at least one selected branch of mathematics	Understands the importance of mathematics in other fields of science.	[SU1] oral statement/conversation/discussion [SU8] observation of student's independent or team work

Subject contents	1. Mathematics in the integral process of education.		
	2. Shaping elementary mathematical concepts and methods of introducing students to definitions.		
	3. Teaching mathematics: problem-based, realistic, text problems and their solution.		
	4. Types of reasoning: empirical, intuitive, formal.		
	5. Problematic, construction problems concerning issues implemented in upper secondary school at an advanced level.		
	6. Mathematical reasoning (proofs).		
	7. Solving and constructing examination tasks at an advanced level of the 4th stage of education.		
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%
	exam	51.0%	50.0%
	test	51.0%	30.0%
	activity	51.0%	20.0%
Recommended reading	Basic literature	[1] S. Kopański, In Search of Mathematical Talents, Wydawnictwo Dla Szkoly, 2003	
		[2] A. Birkholc, Mathematical Analysis for Teachers, PWN	
		[3] W. Żakowski, Mathematics for Candidates for Higher Education	
		[4] G. Polya, How to Solve?, PWN 1964	
		[5] Collections of Matura exam tasks at an advanced level	
		[6] Collections of tasks and school textbooks	
	Supplementary literature	[1] M. Szurek, On Teaching Mathematics, GWO 2005	
	eResources addresses		
Example issues/ example questions/ tasks being completed	not included		
Work placement	Not applicable		

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