

Subject card

Subject name and code	Division and chromatic theorems in combinatorics, PG_00165831						
Field of study	Mathematics						
Date of commencement of studies	October 2024		Academic year of realisation of subject			2025/2026	
Education level	Master's studies		Subject group				
Mode of study	full-time studies		Mode of delivery			at the university	
Year of study	2		Language of instruction			Polish polish language	
Semester of study	3		ECTS credits			5.0	
Learning profile	academic		Assessment form			credit	
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Andrzej Nowik				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	0.0	0.0	30.0	30
	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	30		5.0		90.0	125
Subject objectives	The aim is to prepare students for writing their master's thesis.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[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	The student has an in-depth theoretical knowledge of results and reasoning in partition theorems.	[SW2] presentation/project/paper/report
	[MATMU2_U03] can understand mathematical texts of various types from selected fields of mathematics	The student acquires the ability to understand mathematical texts on partition theorems at an advanced level.	[SU2] presentation/project/paper/report
	[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	The student is able to apply and present methods of partition theorems at an advanced level.	[SU2] presentation/project/paper/report
	[MATMU2_U05] can perform proofs in a selected field and, if necessary, also use tools from other areas of mathematics	The student is able to apply methods of partition theorems in reasoning and in constructing proofs.	[SU2] presentation/project/paper/report
	[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	The student is able to identify their interests in mathematical discussions.	[SU1] oral statement/conversation/discussion
	[MATMU2_U08] is able to prepare in-depth written works in Polish and at least one foreign language in a selected field of mathematics	The student is able to prepare a report and deliver its presentation on a given topic.	[SU2] presentation/project/paper/report
	[MATMU2_U09] can prepare oral presentations in-depth in Polish and at least one foreign language, in a selected field of mathematics	The student is able to prepare a talk and deliver its presentation on a given topic.	[SU2] presentation/project/paper/report
	[MATMU2_K01] is willing to acknowledge the limitations of his or her own knowledge and is willing to pursue further education	The student is aware of the limitations of their own knowledge and demonstrates readiness for further learning.	[SK8] observation of student's independent or team work
	[MATMU2_K05] is ready to independently search for information in literature, also in foreign languages	The student is able to independently search for information in specialized literature.	[SK2] presentation/project/paper/report
	[MATMU2_K02] is ready to precisely formulate questions to deepen his/her understanding of a given topic or find missing elements of reasoning	The student is able to formulate precise questions aimed at deepening the understanding of a given topic.	[SK1] oral statement/conversation/discussion
	[MATMU2_U02] can express mathematical content in speech and writing, in mathematical texts of various nature	The student is able to express mathematical content both orally and in writing in mathematical texts.	[SU2] presentation/project/paper/report
	[MATMU2_W07] knows and understands the basic legal and ethical conditions related to scientific and teaching activities	The student acquires knowledge about copyright law and intellectual property.	[SW2] presentation/project/paper/report
	[MATMU2_K06] is ready to formulate opinions on basic mathematical issues	The student is able to formulate opinions on mathematical issues.	[SK1] oral statement/conversation/discussion
	[MATMU2_K04] is ready to understand and appreciate the importance of intellectual honesty in one's own and other people's actions; ethical conduct	The student understands and values the importance of intellectual honesty.	[SK8] observation of student's independent or team work
Subject contents	Ramsey's theorem, Van der Waerden's theorem, Schur's theorem, Folkman's theorem, Gallai's theorem, Hales-Jewett theorem, Hindman's theorem, geometric partition theorems (such as Graham-Rothschild theorem). Theorems from graph theory including extremal theorems (Turán's theorem), coloring problems (Vizing's theorem, overview of various graph coloring methods). Classical combinatorial games such as NIM games (various versions).		
Prerequisites and co-requisites			

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Monitoring the student's conduct	100.0%	0.0%
	referee	50.0%	100.0%
Recommended reading	Basic literature	R.L.Graham, B.L.Rothschild, J.H.Spencer, Ramsey Theory, Second edition, seria Wiley-Interscience Series In Discrete Mathematics and Optimization.	
	Supplementary literature	G.Chartrand, P. Zhang, Chromatig Graph Theory, series Discrete Mathematics and Its Applications.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	N/A		
Work placement	Not applicable		

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