

STUDY PROGRAMME CURRICULUM MATHEMATICS

Name of study programme	Mathematics
Programme characteristics	
Type	master's
Cycle	master
University of Ljubljana members	• Faculty of Mathematics and Physics, Jadranska ulica 19, 1000 Ljubljana, Slovenija

Year 1

	University Course Code	Course title	Lecturers	Contact hours					Individual student work	Total hours	ECTS	Semesters	Elective
				Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study					
1.	0188808	Programme related electives M1-M5, R1 in O		120	60	120			420	720	24	1st semester	yes
2.	0110214	Open electives		30	15	30			105	180	6	1st semester	yes
3.	0188810	Programme related electives M1-M5, R1 in O		120	60	120			420	720	24	2nd semester	yes
4.	0110216	Open elective		30	15	30			105	180	6	2nd semester	yes
		Total		300	150	300	0	0	1050	1800	60		

Year 2

	University Course Code	Course title	Lecturers	Contact hours					Individual student work	Total hours	ECTS	Semesters	Elective
				Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study					
1.	0188812	Programme related electives M1-M5, R1 in O		60	30	60			210	360	12	1st semester	yes
2.	0110218	Open elective		90	15	90			285	480	16	1st semester	yes
3.	0080138	Mathematical seminar	Matjaž Konvalinka,	0	30	0	0	0	60	90	3	All-year	no

			Primož Moravec										
4.	0110219	Open elective		30		15			75	120	4	2nd semester	yes
5.	0080139	Master's thesis and exam		0	0	0	0	0	750	750	25	2nd semester	no
Total				180	75	165	0	0	1380	1800	60		

Year 1, Year 2, Electives M1 Analysis and mechanics

				Contact hours									
	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Semesters	Elective
1.	0110220	Measure theory	Marko Kandić, Roman Drnovšek	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
2.	0110221	Introduction to functional analysis	Igor Klep, Peter Šemrl, Roman Drnovšek	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
3.	0110222	Functional analysis	Peter Šemrl, Roman Drnovšek	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
4.	0110223	Introduction to C* algebras	Matej Brešar	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
5.	0110224	Operator theory	Marko Kandić, Peter Šemrl, Roman Drnovšek	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
6.	0110225	Introduction to harmonic analysis	Oliver Dragičević	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
7.	0113425	Special functions	Janez Mrčun, Miran Černe, Pavle Saksida	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
8.	0110227	Partial differential equations	Franc Forstnerič, Miran Černe, Pavle Saksida	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
9.	0110228	Complex analysis	Barbara Drinovec-Drnovšek, Franc Forstnerič, Jasna Prezelj, Miran Černe	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes

10.	0110229	Analytical mechanics	George Mejak	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
11.	0110230	Continuum mechanics	George Mejak	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
12.	0110231	Fluid mechanics	George Mejak	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
13.	0110232	Mechanics of deformable bodies	George Mejak	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
14.	0110233	Dynamical systems	Franc Forstnerič, Jasna Prezelj	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
15.	0188889	Topics in analysis	Barbara Drinovec Drnovšek, Franc Forstnerič, Miran Černe, Oleksiy (Aleksey) Kostenko, Oliver Dragičević	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
Total				540	135	450	0	0	1575	2700	90		

Year 1, Year 2, Electives M2 Algebra and discrete mathematics

				Contact hours									
	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Semesters	Elective
1.	0110234	Commutative algebra	David Dolžan, Tomaž Košir	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
2.	0110235	Noncommutative algebra	Igor Klep, Jakob Cimprič, Matej Brešar	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
3.	0110236	Nonassociative algebra	Tomaž Košir	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
4.	0110237	Ordered algebraic structures	Jakob Cimprič, Karin Cvetko-Vah	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
5.	0110238	Theory of semigroups and groups	Jakob Cimprič, Primož Moravec,	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes

			Primož Potočnik, Tomaž Košir										
6.	0110239	Number theory	Tomaž Košir	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
7.	0110240	Combinatorics	Matjaž Konvalinka, Sandi Klavžar	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
8.	0110241	Graph theory	Arjana Žitnik, Primož Potočnik, Riste Škrekovski, Sandi Klavžar	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
9.	0110242	Cardinal arithmetic	Alexander Keith Simpson, Andrej Bauer	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
10.	0110243	Topics in discrete mathematics 1	Matjaž Konvalinka, Primož Potočnik, Riste Škrekovski, Sandi Klavžar	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
11.	0110244	Topics in discrete mathematics 2	Primož Potočnik, Riste Škrekovski, Sandi Klavžar	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
12.	0110245	Applied discrete mathematics	Alen Orbanić, Primož Potočnik, Riste Škrekovski	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
13.	0110246	Logic	Andrej Bauer	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
14.	0190599	Topics in algebra	Igor Klep, Jakob Cimprič, Matej Brešar, Peter Šemrl, Primož Moravec	30	0	30	0	0	105	165	6	1st semester, 2nd semester	yes

	Total	570	45	420	0	0	1470	2505	84	
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Year 1, Year 2, Electives M3 Geometry and topology

	University Course Code	Course title	Lecturers	Contact hours					Individual student work	Total hours	ECTS	Semesters	Elective
				Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study					
1.	0110247	Analysis on manifolds	Franc Forstnerič, Janez Mrčun, Pavle Saksida	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
2.	0110248	Introduction to algebraic geometry	Tomaz Košir	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
3.	0110249	Convexity	Franc Forstnerič, Klemen Šivic	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
4.	0110250	Algebraic topology 1	Dušan Repovš, Janez Mrčun, Petar Pavešić, Sašo Strle	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
5.	0110251	Algebraic topology 2	Dušan Repovš, Janez Mrčun, Petar Pavešić, Sašo Strle	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
6.	0113423	Differential geometry	Janez Mrčun, Pavle Saksida, Sašo Strle	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
7.	0113424	Lie groups	Franc Forstnerič, Janez Mrčun, Pavle Saksida	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
8.	0110254	Riemann surfaces	Barbara Drinovec-Drnovšek, Franc Forstnerič, Miran Černe, Pavle Saksida	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
	Total			315	45	240	0	0	840	1440	48		

Year 1, Year 2, Electives M4 Numerical mathematics

	University Course Code	Course title	Lecturers	Contact hours					Individual student work	Total hours	ECTS	Semesters	Elective
				Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study					
1.	0110255	Numerical integration and ordinary differential equations	Emil Žagar, Marjetka Knez	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
2.	0110256	Numerical solving of partial differential equations	Emil Žagar, Marjetka Knez	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
3.	0110257	Iterative numerical methods in linear algebra	Bor Plestenjak	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
4.	0109559	Computer aided (geometric) design	Emil Žagar, Jan Grošelj, Marjetka Knez	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
5.	0110259	Numerical approximation and interpolation	Emil Žagar, Marjetka Knez	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
6.	0110260	Numerical methods for linear control systems	Bor Plestenjak	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
7.	0541534	Topics in numerical mathematics	Bor Plestenjak, Emil Žagar, Marjetka Knez	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
Total				240	75	210	0	0	735	1260	42		

Year 1, Year 2, Electives M5 Probability, statistics and financial mathematics

				Contact hours									
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	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Semesters	Elective
1.	0079378	Probability 2	Mihael Perman	45	0	30	0	0	105	180	6	1st semester	yes
2.	0110274	Statistics 2	Jaka Smrekar, Mihael Perman	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
3.	0079631	Bayesian statistics	Jaka Smrekar	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
4.	0079377	Financial mathematics 2	Janez Bernik	45	0	30	0	0	105	180	6	1st semester	yes
5.	0079634	Econometrics	Mihael Perman	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
6.	0079671	Stochastic processes 2	Janez Bernik, Mihael Perman	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
7.	0079672	Stochastic processes 3	Mihael Perman, Oliver Dragičević	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
8.	0079626	Actuarial mathematics	Janez Bernik, Mihael Perman	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
9.	0079656	Modelling with stochastic processes	Janez Bernik	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
10.	0079644	Topics in game theory	Matjaž Konvalinka, Sergio Cabello Justo	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
11.	0079640	Topics in financial mathematics 1	Tomaž Košir	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
12.	0079641	Topics in financial mathematics 2	Mihael Perman, Tomaž Košir	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
13.	0079664	Optimization in finance	Bor Plestenjak, Jaka Smrekar, Janez Bernik, Mihael Perman, Tomaž Košir	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes

14.	0079686	Time series	Mihael Perman	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
15.	0079670	Riesz spaces in mathematical economics	Marko Kandić, Roman Drnovšek	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
16.	0079660	Numerical methods for financial mathematics	Jaka Smrekar, Janez Bernik, Marjetka Knez, Mihael Perman, Tomaž Košir	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
17.	0079635	Financial mathematics 3	Tomaž Košir	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
Total				555	210	510	0	0	1785	3060	102		

Year 1, Year 2, Electives R1 Computational mathematics

	University Course Code	Course title	Lecturers	Contact hours					Individual student work	Total hours	ECTS	Semesters	Elective
				Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study					
1.	0110261	Mathematics with computers	Andrej Bauer	15	30	30	0	0	105	180	6	1st semester, 2nd semester	yes
2.	0110262	Computability theory	Andrej Bauer	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
3.	0110263	Computational complexity	Sergio Cabello Justo	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
4.	0110264	Topics in mathematical foundations of computer science	Andrej Bauer, Sergio Cabello Justo	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
5.	0110265	Topics in optimization	Emil Žagar, Sergio Cabello Justo	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
6.	0110266	Optimization 2	Emil Žagar, Sergio	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes

			Cabello Justo										
7.	0110267	Data structures and algorithms 3	Sergio Cabello Justo	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
		Total		210	105	210	0	0	735	1260	42		

Year 1, Year 2, Electives

	University Course Code	Course title	Lecturers	Contact hours					Individual student work	Total hours	ECTS	Semesters	Elective
				Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study					
1.	0110268	Astronomy	Tomaž Zwitter	60	0	30	0	0	120	210	7	All-year	yes
2.	0110269	Theoretical physics	Anton Ramšak	60	0	30	0	0	120	210	7	1st semester, 2nd semester	yes
3.	0110270	Modern physics	Peter Križan, Sašo Grozdanov, Svjetlana Fajfer	45	0	30	0	0	105	180	6	1st semester, 2nd semester	yes
4.	0110271	Mathematical models in biology	Jasna Prezelj	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
5.	0110272	Mathematics in industry	George Mejak	0	30	0	0	0	150	180	6	1st semester, 2nd semester	yes
6.	0079379	Workplace experience 1	Matjaž Konvalinka, Primož Moravec	0	15	0	0	0	165	180	6	2nd semester	yes
7.	0079260	Workplace experience 2	Matjaž Konvalinka, Primož Moravec	0	15	0	0	0	165	180	6	2nd semester	yes
8.	0191092	Advanced Machine Learning	Ljupčo Todorovski, Matija Pretnar	30	15	30	0	0	105	180	6	1st semester, 2nd semester	yes
		Total		225	90	150	0	0	1035	1500	50		

Students select min. 1 subject: Theory of measures or Introduction to functional analysis.

The selection is approved by the comission of the Department of mathematics.