Mathmatical sciences
master study programme, second Bologna cycle

COURSE STRUCTURE of the study programme

The study programme consists of 12 courses (3 core courses and 9 elective courses), 2 seminars, and the preparation and defence of a Master's thesis. Elective courses are divided into internal electives (6) and external electives (3). Upon enrolment in the first year, students select a field of study, which determines the choice of core and internal elective courses (further details are provided below).

Within the first year seminar, students deliver at least one lecture or presentation, while in the second year they attend lectures as part of the faculty's Research Mathematics Seminar.

Students may register the topic of their Master's thesis after completing the core courses, the first year internal elective courses, and the first year seminar. All remaining academic requirements must be completed prior to the submission of the Master's thesis. The Master's thesis must be at the level of a review article or an original scientific article with a minor contribution in the relevant scientific field, or a more extensive project assignment with a completed product, report, and documentation. The topic of the Master's thesis is first presented publicly in a seminar, after which the student prepares the thesis and subsequently defends it in a public oral defence.

Students complete the programme once they have fulfilled all academic requirements, successfully defended their Master's thesis, and accumulated a total of 120 ECTS under the European Credit Transfer and Accumulation System (ECTS).

All courses in the study programme carry 6 ECTS, while some elective courses are assigned 3 ECTS.

The following section presents the structure of the study programme by year, as well as the compulsory and internal elective courses and the fields of study.

Table 1: Structure of the study programme

Year of study	Study obligation	ECTS-credits (ECTS)	
		ECTS	ECTS/Year of study
1.	Basic Course I	6	60
	Basic Course II	6	
	Basic Course III	6	
	Internal Elective Course I	6	
	Internal Elective Course II	6	
	Internal Elective Course III	6	
	External Elective Course I	6	
	External Elective Course II	6	
	Seminar I	6	
	Seminar II	6	
2.	Internal Elective Course IV	6	60
	Internal Elective Course V	6	
	Internal Elective Course VI	6	

Legend:

ECTS credits (ECTS) = credit points awarded under the European Credit Transfer and Accumulation System (ECTS). The credit system facilitates student mobility and the mutual recognition of completed academic requirements.

ECTS credits represent an average estimate of the time required to complete a course and include both organized forms of instruction (lectures, seminars, seminar and laboratory exercises, fieldwork, practical training, etc.) and the student's independent work (exam preparation and other course-related obligations, etc.). One (1) ECTS credit corresponds to 25 to 30 hours of study workload. Credits are awarded upon the successful completion of the requirements for an individual course.

Year of study	Study obligation	ECTS-credits (ECTS)	
		ECTS	ECTS/Year of study
	External Elective Course III	6	
	Seminar III	6	
	Seminar IV	6	
	Master's Thesis	24	

Table 2: Basic Courses

No.	Course	ECTS
1.	Selected Topics in Algebra (1)	6
2.	Selected Topics in Analysis (1)	6
3.	Selected Topics in Discrete Mathematics (1)	6
4.	Selected Topics in Financial Mathematics (1)	6
5.	Selected Topics in Cryptography (1)	6
6.	Selected Topics in Mathematical Statistics (1)	6
7.	Molecular Modeling Course	6
8.	Selected Topics in Functional Analysis	6
9.	Mathematical Practicum	6

Table 2 lists all core courses accredited within the Mathematical Sciences study programme. However, UP FAMNIT offers only a selection of core courses from the broader pool each academic year. In doing so, the faculty takes into account its staffing and financial capacities, as well as student interest in individual courses. The final list of courses offered to students for the upcoming academic year is published prior to the start of enrolment for that year.

ELECTIVE courses

Elective courses are selected by students in the first and second year of study.

Upon enrolment in the first year, students select a field of study, which determines the choice of core and internal elective courses. Further information on the fields of study is provided below.

Students select a total of nine elective courses, of which six are internal electives and three are external electives.

External elective courses may be selected within accredited study programmes at higher education institutions in Slovenia or abroad. Within the framework of external electives, students may choose courses from the fields of social sciences, economics and business, humanities, and natural sciences, or they may select courses within the professional field of mathematics. Students may also choose an external elective course from the pool of internal elective courses or from the core courses of a non-selected field of study.

Table 3: Internal Elective Courses

No.	Course	ECTS
1.	Algebraic Combinatorics	6
2.	Elliptic Curves in Cryptography	6
3.	Philosophy	3
4.	Healthcare Financing	6
5.	Geometry and Topology	3
6.	Geometric Measure Theory	3
7.	Geometric Aspects in Discrete Dynamical Systems	6
8.	Geometrical Optimization Problems	3
9.	Groups, Covers and Maps	6
10.	Selected Topics in Algebra (2)	6
11.	Selected Topics in Partial Differential Equations	6
12.	Selected Topics in Dynamical Systems	6
13.	Selected Topics in Discrete Mathematics (2)	6
14.	Selected Topics in Complex Analysis	6
15.	Selected Topics in Mathematical Statistics (2)	6
16.	Selected Topics in Numerical Mathematics	6
17.	Selected Topics in Theory of Association Schemes	6
18.	Selected Topics in Theory of Finite Geometries	6
19.	Selected Topics in Number Theory	6
20.	Selected Topics in Topology	6
21.	Selected Topics in Computing Methods and Applications	6
22.	Chaotic Dynamical Systems	6
23.	Characters of Finite Groups	6
24.	Combinatorial and Convex Geometries	6
25.	Combined Quantum and Classical Methods for Molecular Simulations	6
26.	Cryptographic Hash Functions and Block Chains	6
27.	Lie Groups and Lie Algebras	3
28.	Mathematical Modelling	6
29.	Mathematical Finances in Real Time	6
30.	Mathematical Topics in a Foreign Language	6
31.	Molecular Dynamics Simulation Methods	6
32.	Molecular Graphics	6
33.	Computer Aided Geometric Design	3
34.	Symmetry and Traversability in Graphs	6
35.	Stochastic Processes	6

No.	Course	ECTS
36.	Game Theory	6
37.	Coding Theory	6
38.	Theory of Finite Fields	6
39.	Measure Theory	6
40.	Theory of Permutation Groups	6
41.	Project Management	3
42.	Introduction to Public-key Cryptography	6
43.	Introduction to Symmetric-cipher Cryptography	6
44.	Probability with Measure (1)	6
45.	Probability with Measure (2)	6
46.	Probability	6
47.	History and Methodology of the Subject	3

Table 5 lists **all internal elective courses** accredited within the Mathematical Sciences study programme. However, UP FAMNIT **offers only a selection of elective courses** from the broader pool each academic year. In doing so, the faculty takes into account its staffing and financial capacities, as well as student interest in individual courses. The final list of elective courses offered to students for the upcoming academic year is published prior to the start of enrolment for that year.

STUDY fields

Students select their field of study upon enrolment in the first year.

The study programme offers eight fields: General Mathematics, Discrete Mathematics, Financial Mathematics, Geometry and Applications, Cryptography, Computer Intensive Methods and Applications, Theoretical Mathematics, and Probability and Statistics.

Each of the eight fields is associated with a block of core and internal elective courses, as presented below.

For all fields of study, students may select external elective courses within accredited study programmes at higher education institutions in Slovenia or abroad. Within the framework of external electives, students may choose courses from the fields of social sciences, humanities, and natural sciences, or select courses within the professional field of mathematics. Students may also choose an external elective course from the pool of internal elective courses or from the core courses of a non-selected field of study.

Study field GENERAL MATHEMATICS

Students must complete the following requirements (in accordance with the programme structure presented in Table 1):

- 3 BASIC courses from the General, Theoretical and Discrete Mathematics Core;
- 6 INTERNAL ELECTIVE courses (student's choice) in the amount of 36 ECTS,
- EXTERNAL ELECTIVE courses in the amount of 18 ECTS;

- 4 SEMINARS in a total amount of 24 ECTS credits;
- prepare and defend the MASTER'S THESIS.

BASIC COURSES for the GENERAL, THEORETICAL AND DISCRETE MATHEMATICS CORE:
- Selected Topics in Algebra (1) (6 ECTS),
- Selected Topics in Analysis (1) (6 ECTS),
- Selected Topics in Discrete Mathematics (1) (6 ECTS),
- Selected Topics in Functional Analysis (6 ECTS).

Study field DISCRETE MATHEMATICS

Students must complete the following requirements (in accordance with the programme structure presented in Table 1):
- BASIC courses from the General, Theoretical or Discrete Mathematics core;
- 3 INTERNAL ELECTIVE courses from the Discrete Mathematics core in the amount of 18 ECTS;
- 3 INTERNAL ELECTIVE courses (student's choice) in the amount of 18 ECTS,
- EXTERNAL ELECTIVE courses in the amount of 18 ECTS;
- 4 SEMINARS in a total amount of 24 ECTS credits;
- prepare and defend the MASTER'S THESIS.

BASIC COURSES for the GENERAL, THEORETICAL AND DISCRETE MATHEMATICS CORE:
- Selected Topics in Algebra (1) (6 ECTS),
- Selected Topics in Analysis (1) (6 ECTS),
- Selected Topics in Discrete Mathematics (1) (6 ECTS),
- Selected Topics in Functional Analysis (6 ECTS).

INTERNAL ELECTIVE COURSES for the DISCRETE MATHEMATICS:
- Algebraic Combinatorics (6 ECTS),
- Groups, Covers and Maps (6 ECTS),
- Selected Topics in Discrete Mathematics (2) (6 ECTS),
- Selected Topics in Theory of Association Schemes (6 ECTS),
- Selected Topics in Theory of Finite Geometries (6 ECTS),
- Symmetry and Traversability in Graphs (6 ECTS),
- Theory of Finite Fields (6 ECTS).

Study field FINANCIAL MATHEMATICS

Students must complete the following requirements (in accordance with the programme structure presented in Table 1):
- 2 BASIC courses from the General, Theoretical or Discrete Mathematics core;
- 1 BASIC course from the Financial Mathematics core;
- 3 INTERNAL ELECTIVE courses from the Financial Mathematics core in the amount of 18 ECTS;
- 3 INTERNAL ELECTIVE courses (student's choice) in the amount of 18 ECTS,
- EXTERNAL ELECTIVE courses in the amount of 18 ECTS;
- 4 SEMINARS in a total amount of 24 ECTS credits;
- prepare and defend the MASTER'S THESIS.

BASIC COURSES for the GENERAL, THEORETICAL AND DISCRETE MATHEMATICS CORE:
- Selected Topics in Algebra (1) (6 ECTS),
- Selected Topics in Analysis (1) (6 ECTS),
- Selected Topics in Discrete Mathematics (1) (6 ECTS),
- Selected Topics in Functional Analysis (6 ECTS).

BASIC COURSE for the FINANCIAL MATHEMATICS CORE:
- Selected Topics in Financial Mathematics (1) (6 ECTS).

INTERNAL ELECTIVE COURSES for the FINANCIAL MATHEMATICS:
- Healthcare Financing (6 ECTS),
- Selected Topics in Mathematical Statistics (1) (6 ECTS),
- Mathematical Modelling (6 ECTS),
- Mathematical Finances in Real Time (6 ECTS),
- Game Theory (6 ECTS),
- Probability with Measure (1) (6 ECTS).

Study field GEOMETRY AND APPLICATIONS

Cooperation with Lomonosov Moscow State University – the field is not offered in the 2025/2026 academic year

Students who choose the *Geometry and Applications field* (delivered exclusively in English) may complete the first year of study at UP FAMNIT and the second year at Lomonosov Moscow State University. In the first year, the student enrols at UP FAMNIT, while in the second year they are enrolled at both UP FAMNIT and Lomonosov. Upon completion of the programme, and in accordance with the agreement between the University of Primorska and Lomonosov, the student is awarded degrees from both universities.

Students who do not opt to study at Lomonosov complete the entire programme at UP FAMNIT and are awarded a degree from the University of Primorska.

Tuition fees for the first year are the same for all students enrolled in the Mathematical Sciences study programme, in accordance with the UP FAMNIT fee schedule. The tuition fee for the second year varies depending on whether the student chooses to study at Lomonosov. Students who decide to complete part of their studies at Lomonosov pay the second-year tuition fee at Lomonosov (at UP FAMNIT they pay only enrolment-related fees for the second year). The amount of tuition at Lomonosov will be announced at a later date.

Students must complete the following requirements (in accordance with the programme structure presented in Table 1):
- 3 BASIC courses from the Geometry and Applications core;
- INTERNAL ELECTIVE courses in the total amount of 27 ECTS: Selected Topics in Dynamical Systems (6 ECTS), Selected Topics in Complex Analysis (6 ECTS), Selected Topics in Topology (6 ECTS), Combinatorial and Convex Geometries (6 ECTS), Geometry and Topology (3 ECTS),
- INTERNAL ELECTIVE courses from the Geometry and Applications core that are not included in the previous paragraph, in the total amount of 9 ECTS;
- foreign language (English or Russian) as EXTERNAL ELECTIVE course in the amount of 6 ECTS;

- EXTERNAL ELECTIVE courses that fall within the professional field of philosophy, history and project management in the total amount of at least 9 ECTS. A student can also choose these elective courses with the following three elective courses: Philosophy (3 ECTS), History and Methodology of the Subject (3 ECTS), Project management (3 ECTS);
- if the student hasn't achieved enough ECTS with EXTERNALLY ELECTIVE COURSES in the previous two paragraphs (18 ECTS), also an EXTERNAL ELECTIVE course in the amount of 3 ECTS;
- 4 SEMINARS in a total amount of 24 ECTS credits;
- prepare and defend the MASTER'S THESIS.

A student who chooses the study field Geometry and Applications, in the process of preparing the Master's Thesis, should pass the comprehensive examination with the chosen mentor; the exam covers the basic mathematical topics in the field of analysis, abstract algebra and geometry.

BASIC COURSES for the GEOMETRY AND APPLICATIONS CORE:
- Selected Topics in Algebra (1) (6 ECTS),
- Selected Topics in Analysis (1) (6 ECTS),
- Mathematical Practicum (6 ECTS).

INTERNAL ELECTIVE COURSES for the GEOMETRY AND APPLICATIONS CORE:
- Selected Topics in Dynamical Systems (6 ECTS),
- Selected Topics in Complex Analysis (6 ECTS),
- Selected Topics in Topology (6 ECTS),
- Combinatorial and Convex Geometries (6 ECTS),
- Geometry and Topology (3 ECTS),
- Geometric Measure Theory (3 ECTS),
- Geometric Aspects in Discrete Dynamical Systems (6 ECTS),
- Geometrical Optimization Problems (3 ECTS),
- Lie Groups and Lie Algebras (3 ECTS),
- Computer Aided Geometric Design (3 ECTS),
- History and Methodology of the Subject (3 ECTS),
- Project Management (3 ECTS),
- Philosophy (3 ECTS).

Study field CRYPTOGRAPHY

Students must complete the following requirements (in accordance with the programme structure presented in Table 1):
- 2 BASIC courses from the General, Theoretical or Discrete Mathematics core;
- 1 BASIC course from the Cryptography core;
- 3 INTERNAL ELECTIVE courses from the Cryptography core in the amount of 18 ECTS;
- 3 INTERNAL ELECTIVE courses (student's choice) in the amount of 18 ECTS,
- EXTERNAL ELECTIVE courses in the amount of 18 ECTS;
- 4 SEMINARS in a total amount of 24 ECTS credits;
- prepare and defend the MASTER'S THESIS.

BASIC COURSES for the GENERAL, THEORETICAL AND DISCRETE MATHEMATICS CORE:
- Selected Topics in Algebra (1) (6 ECTS),

- Selected Topics in Analysis (1) (6 ECTS),
- Selected Topics in Discrete Mathematics (1) (6 ECTS),
- Selected Topics in Functional Analysis (6 ECTS).

BASIC COURSE for the CRYPTOGRAPHY CORE:
- Selected Topics in Cryptography (1) (6 ECTS).

INTERNAL ELECTIVE COURSES for the CRYPTOGRAPHY CORE:
- Algebraic Combinatorics (6 ECTS),
- Elliptic Curves in Cryptography (6 ECTS),
- Coding Theory (6 ECTS),
- Theory of Finite Fields (6 ECTS),
- Introduction to Public-key Cryptography (6 ECTS),
- Introduction to Symmetric-cipher Cryptography (6 ECTS),
- Cryptographic Hash Functions and Block Chains (6 ECTS),
- Selected Topics in Number Theory (6 ECTS).

Study field COMPUTER INTENSIVE METHODS AND APPLICATIONS

Students must complete the following requirements (in accordance with the programme structure presented in Table 1):
- 2 BASIC courses from the General, Theoretical or Discrete Mathematics core;
- 1 BASIC course from the Computer Intensive Methods and Applications core;
- 3 INTERNAL ELECTIVE courses from the Computer Intensive Methods and Applications core in the amount of 18 ECTS;
- 3 INTERNAL ELECTIVE courses (student's choice) in the amount of 18 ECTS,
- EXTERNAL ELECTIVE courses in the amount of 18 ECTS;
- 4 SEMINARS in a total amount of 24 ECTS credits;
- prepare and defend the MASTER'S THESIS.

BASIC COURSES for the GENERAL, THEORETICAL AND DISCRETE MATHEMATICS CORE:
- Selected Topics in Algebra (1) (6 ECTS),
- Selected Topics in Analysis (1) (6 ECTS),
- Selected Topics in Discrete Mathematics (1) (6 ECTS),
- Selected Topics in Functional Analysis (6 ECTS).

BASIC COURSE for the COMPUTER INTENSIVE METHODS AND APPLICATIONS CORE:
- Molecular Modelling Course (6 ECTS).

INTERNAL ELECTIVE COURSES for the COMPUTER INTENSIVE METHODS AND APPLICATIONS CORE:
- Selected Topics in Discrete Mathematics (1) (6 ECTS),
- Selected Topics in Numerical Mathematics (6 ECTS),
- Selected Topics in Computing Methods and Applications (6 ECTS),
- Combined Quantum and Classical Methods for Molecular Simulations (6 ECTS),
- Selected Topics in Mathematical Statistics (1) (6 ECTS),
- Molecular Dynamics Simulation Methods (6 ECTS),
- Molecular Graphics (6 ECTS).

Study field THEORETICAL MATHEMATICS

Students must complete the following requirements (in accordance with the programme structure presented in Table 1):

- 3 BASIC courses from the General, Theoretical or Discrete Mathematics core;
- 3 INTERNAL ELECTIVE courses from the Analysis core in the amount of 18 ECTS;
- 3 INTERNAL ELECTIVE courses from the Algebra core in the amount of 18 ECTS;
- EXTERNAL ELECTIVE course in the amount of 18 ECTS;
- 4 SEMINARS in a total amount of 24 ECTS credits;
- prepare and defend the MASTER'S THESIS.

BASIC COURSES for the GEOMETRY AND APPLICATIONS CORE:

- Selected Topics in Algebra (1) (6 ECTS),
- Selected Topics in Analysis (1) (6 ECTS),
- Selected Topics in Discrete Mathematics (1) (6 ECTS),
- Selected Topics in Functional Analysis (6 ECTS).

INTERNAL ELECTIVE COURSES for the ALGEBRA CORE:

- Algebraic Combinatorics (6 ECTS),
- Selected Topics in Algebra (2) (6 ECTS),
- Selected Topics in Number Theory (6 ECTS),
- Characters of Finite Groups (6 ECTS),
- Theory of Finite Fields (6 ECTS),
- Theory of Permutation Groups (6 ECTS).

INTERNAL ELECTIVE courses for the ANALYSIS CORE:

- Selected Topics in Analysis (2) (6 ECTS),
- Selected Topics in Complex Analysis (6 ECTS),
- Selected Topics in Numerical Mathematics (6 ECTS),
- Selected Topics in Topology (6 ECTS),
- Chaotic Dynamical Systems (6 ECTS).

Study field PROBABILITY AND STATISTICS

Students must complete the following requirements (in accordance with the programme structure presented in Table 1):

- 2 BASIC courses from the General, Theoretical or Discrete Mathematics core;
- 1 BASIC course from the Probability and Statistics core;
- 3 INTERNAL ELECTIVE courses from the Probability and Statistics core in the amount of 18 ECTS;
- 3 INTERNAL ELECTIVE courses (student's choice) in the amount of 18 ECTS,
- EXTERNAL ELECTIVE courses in the amount of 18 ECTS;
- 4 SEMINARS in a total amount of 24 ECTS credits;
- prepare and defend the MASTER'S THESIS.

BASIC COURSES for the GENERAL, THEORETICAL AND DISCRETE MATHEMATICS CORE:

- Selected Topics in Algebra (1) (6 ECTS),
- Selected Topics in Analysis (1) (6 ECTS),

- Selected Topics in Discrete Mathematics (1) (6 ECTS),
- Selected Topics in Functional Analysis (6 ECTS).

BASIC COURSES for the PROBABILITY AND STATISTICS CORE:
- Selected Topics in Mathematical Statistics (1) (6 ECTS).

INTERNAL ELECTIVE COURSES for the PROBABILITY AND STATISTICS CORE:
- Selected Topics in Mathematical Statistics (2) (6 ECTS),
- Mathematical Modelling (6 ECTS),
- Stochastic Processes (6 ECTS),
- Probability with Measure (1) (6 ECTS),
- Probability with Measure (2) (6 ECTS).

For assistance and guidance regarding core and elective courses and fields of study, students may consult the study programme coordinator.

Contact:
Programme coordinator:
Prof. Dr. Vito Vitrih
vito.vitrih@upr.si

Student Services
referat@famnit.upr.si