

University of Maribor
Faculty of Natural Sciences and Mathematics

Information on the undergraduate programme
Educational mathematics

A) General description

QUALIFICATION AWARDED

Undergraduate programme of university studies Educational Mathematics

Qualification awarded: University degree in Educational Mathematics.

Duration of study: 3 years

ADMISSION REQUIREMENTS

Undergraduate university programme:

- a) a successfully completed Matura examination, or
- b) a successfully completed vocational Matura examination and exam from one of the subjects of the Matura examination; or
- c) successfully finished four year secondary school before June 1, 1995.

In case of enrolment limitations, applicants under

- a) are admitted according to their GPA on the Matura examination (30 % of the points), grade in Mathematics on the Matura examination (30 % of the points), GPA in the third and fourth year of secondary school (20 % of the points), grade in Mathematics in the third and fourth year of secondary school (20 % of the points);
- b) are admitted according to their GPA on the vocational Matura examination (50 % of the points), grade in Mathematics in the third year of secondary school (25 % of the points), and grade in Mathematics in the fourth year of secondary school (25 % of the points);
- c) are admitted according to their GPA on the Final examination (30 % of the points), grade in Mathematics on the Final examination (30 % of the points), GPA in the third and fourth year of secondary school (20 % of the points), grade in Mathematics in the third and fourth year of secondary school (20 % of the points).

EDUCATIONAL AND PROFESSIONAL GOALS

The main educational and professional goal is to educate the students in the following fields: analysis, algebra, number theory, geometry, combinatorics, probability and statistics, mathematical modeling, computer science and ICT, and fundamental pedagogical sciences. All the fields are in accordance with the current employment needs and the envisioned future needs of educational experts. The graduates of the undergraduate study are able to perform their work with the support of communicational, informational and computer systems.

The main general competences achieved by the graduates:

- Graduates gain the ability of analytical thinking and understanding of different systems, which enables the graduates to integrate themselves into the interdisciplinary groups.
- Graduates gain skills of good interpersonal communication together with skills of written and oral expression in mother tongue.
- Graduates are able to study and manage resources in one of the foreign languages.
- Graduates master communication and other skills that enable them to integrate into team work in local as well as international educational and scientific environment.
- Graduates are able to employ a holistic view of the educational process and renew the forms of the discipline with inter-subject connections.

- Graduates are qualified for autonomous professional work and for self evaluation.
- Graduates are able to work with ICT, to follow its development and autonomously evaluate the meaning of different media and discoveries for effective learning process.
- Graduates are sensitive for different social situations and contexts.
- Graduates are aware of professional ethics, and of multicultural issues in the field of education.
- Graduates develop positive attitude towards teaching profession.

The main specific competences achieved by the graduates:

- Graduates are familiar with basic theoretical standpoints of mathematics as a scientific discipline.
- Graduates are familiar with fundamental mathematical terms, concepts, procedures (algorithms) and symbolic language.
- Graduates gain ability for computational skills and use of different strategies and heuristics for problem solving (higher-order thinking).
- Graduates are able for metacognition and logical thinking in different contexts (higher-order thinking).
- Graduates are able to communicate about issues in mathematics and mathematics education.
- Graduates are qualified for system thinking that enables them to integrate into interdisciplinary working groups coping with mathematics and related scientific, professional and practical problems.
- Graduates are familiar with different educational theories and consequences of including the theories into the educational process.
- Graduates develop positive attitude towards mathematics and recognize it's place and value in cultural and scientific development of ancient and modern civilisations.

ACCESS TO FURTHER STUDIES

Graduates of the undergraduate university programme Educational Mathematics can continue their studies at the second level leading to the second bologna degree (usually towards teaching profession). Graduates of the postgraduate level will be able to continue the studies at a higher level leading to the Doctor degree.

COURSE STRUCTURE DIGRAM WITH CREDITS

Complete curricula of the undergraduate university programme of the Educational Mathematics are given in the following pages. All the courses (obligatory and elective) are given together with the semester of study, the amount and type of the contact hours and the assigned number of the ECTS credits. The abbreviations in the curriculum have the following meaning:

L – Lectures

EL – experimental lectures

S – Seminar

T – Tutorial

LW – lab work

FW – field work

Undergraduate university programme Educational mathematics and...

1st year, 1st semester

Course number	Course title	L /EL	S	T	LW	FW	Total contact hours	Individual work	Total hours/ ECTS
1	Introduction to mathematics	30		45			75	105	180/6
2	Matrix Algebra	30		45			75	105	180/6
3	a) Fundamentals of computer science*, ** or b) Numerical problem solving*, **	15 (30)*			22,5 (45)*		37,5 (75)*	52,5 (105)*	90 (180)* / 3 (6)*
	Cummulative	75		90	22,5		187,5	262,5	450/30

1st year, 2nd semester

Course number	Course title	L /EL	S	T	LW	F W	Total contact hours	Individual work	Total hours/ ECTS
4	Basics of analysis	60		30			90	90	180/6
5	Algebraic structures	45		30			75	105	180/6
6	Common course (see list below)*, ***	15 (30)*	7,5 (15)*		15 (30)*		37,5 (75)*	52,5 (105)*	90 (180)* / 3 (6)*
	Cummulative	120	7,5	60	15		202,5	247,5	450/30

* Course, common to both programmes, each of the two programmes is participating $\frac{1}{2}$ of the ECTS and $\frac{1}{2}$ of contact hours.

** Students of the combination *Educational mathematics and educational computer science* choose the course 3b), all the other students choose the course 3a).

*** Student chooses one of the courses from the list of common courses. Students of the combination *Educational mathematics and physics* choose Chemistry, all the other students choose Physics. The courses proposed have different amount of contact hours. In the calculation above a typical course of type 30L, 15S, 15 LW was taken in account.

Common courses

Course title	L /EL	S	T	LW	FW	Total contact hours	Individual work	Total hours/ ECTS
Fundamentals of computer science	30		45			75	105	180 / 6
Numerical problem solving	30		45			75	105	180 / 6
Physics	30	30		15		75	105	180 / 6
Chemistry	45			30		75	105	180 / 6
Modern biology	30	30				60	120	180 / 6
Basic concepts of design and technology	30	15		30		75	105	180 / 6

2nd year, 3rd semester

Course number	Course title	L /EL	S	T	L W	F W	Total contact hours	Individual work	Total hours/ ECTS
7	Analysis	45		30			75	105	180/6
8	Plane and solid geometry	45		30	15		90	90	180/6
9	Psychology of development and learning*	22,5 (45)*	7,5 (15)*	7,5 (15)*			37,5 (75)*	52,5 (105)*	90 (180)* / 3 (6)*
	Cummulative	112,5	7,5	67,5	15		202,5	247,5	450/30

2nd year, 4th semester

Course number	Course title	L /EL	S	T	LW	F W	Total contact hours	Individual work	Total hours/ ECTS
10	Number Theory	45		45			90	90	180/6
11	Combinatorics and probability	30		30			60	60	120/4
12	ICT*	15 (30)*			15 (30)*		30 (60)*	30 (60)*	60 (120) / 2 (4)*
13	Elective Course 1 (see the list below)*, ****	7,5 (15)*		7,5 (15)*	0		15 (30)*	75 (150)	90 (180)* / 3 (6)*
	Cummulative	97,5		82,5	15		195	255	450/30

3rd year, 5th semester

Course number	Course title	L /EL	S	T	L W	F W	Total contact hours	Individual work	Total hours/ ECTS
14	Selected topics in analysis	45		30			75	105	180/6
15	Statistics in education	30		0	15		45	75	120/4
16	Pedagogycs*	15 (30)*	7,5 (15)*				22,5 (45)*	37,5 (75)*	60 (120)* / 2 (4)*
17	Elective Course 2 (see the list below)*, ****	7,5 (15)*		7,5 (15)*			15 (30)	75 (150)	90 (180)* / 3 (6)*
	Cummulative	97,5	7,5	37,5	15		157,5	292,5	450/30

3rd year, 6th semester

Course number	Course title	L /EL	S	T	L W	F W	Total contact hours	Individual work	Total hours/ ECTS
18	Matemactical modelling	30	15		15		60	120	180/6
19	Seminar		30				30	90	120/4
20	Didactics*	15 (30)*	7,5 (15)*				22,5 (45)*	37,5 (75)*	60 (120) / 2 (4)*
21	Elective Course 3 (see the list bellow)*, ****	7,5 (15)*		7,5 (15)*			15 (30)	75 (150)	90 (180)* / 3 (6)*
	Cummulative	52,5	52,5	7,5	15		127,5	322,5	450/15

* Course, common to both programmes, each of the two programmes is participating ½ of the ECTS and ½ of contact hours.

**** Student chooses one of the courses from the list of common courses above, the list of elective courses bellow or some other courses in any other program, having the requested number of ECTS. The courses proposed have different amount of contact hours. In the calculation above a typical “computer science course” of type 30L, 45 LW was taken in account for elective course 1, and typical math course of type 45L, 30S was taken in account for elective courses 2 and 3.

Elective Courses

Course title	L /EL	S	T	LW	FW	Total contact hours	Individual work	Total hours/ ECTS
Geometry	15		15			30	150	180 / 6
Set Theory	15		15			30	150	180 / 6
Programming practicum	15			15		30	150	180 / 6
Application software in education	15			15		30	150	180 / 6
Web applications in education	15			15		30	150	180 / 6
Financial mathematics	15		15			30	150	180 / 6

FINAL EXAMINATION

There is no final examination.

EXAMINATION AND ASSESMENT REGULATIONS

The examinations are usually written and oral. Some of the courses involve the preparation of a seminar work which is usually defended by an oral presentation. The oral examination is usually preconditioned by laboratory attendance, the successful completion of the written exam and the seminar work where required.

Timetables of examinations are issued yearly by the Faculty senate at the beginning of the academic year and are published on the faculty web page and on the notice boards. There are at least 5 examinations for each course per academic year and students are free to choose the

date of examination. The students need to register for examination 7 days before the examination date. The examination can be cancelled no later than 3 days before the examination date. The use of calculators, literature and other items during the examination is determined by the lecturer and may vary from course to course.

ECTS DEPARTMENTAL CO-ORDINATOR

ECTS departmental co-ordinator is the actual head of the department.

Information on the degree programme
Educational Mathematics
(Izobraževalna matematika)

B) List of Subjects

Undergraduate university programme Educational mathematics and...

Code	Course title	Type	ECTS
	Introduction to mathematics	O	6
	Matrix Algebra	O	6
	Fundamentals of computer science	O	3(6)
	Numerical problem solving	O	3(6)
	Basic analysis	O	6
	Algebraic structures	O	6
	Physics	O	3(6)
	Chemistry	O	3(6)
	Modern biology	O	3(6)
	Basic concepts of design and technology	O	3(6)
	Analysis	O	6
	Plane and solid geometry	O	6
	Psychology of development and learning	O	3(6)
	Number Theory	O	6
	Combinatorics and probability	O	4
	ICT	O	2(4)
	Selected topics in analysis	O	6
	Statistics in education	O	4
	Didactics	O	2(4)
	Matemactical modelling	O	6
	Seminar	O	4
	Pedagogy	O	2(4)
	Geometry	E	6
	Set Theory	E	6
	Programming practicum	E	6
	Application software in education	E	6
	Web applications in education	E	6
	Financial mathematics	E	6

O ... obligatory course E ... elective course