



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

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2000 Maribor, Slovenia

UNIVERSITY OF MARIBOR
FACULTY OF NATURAL SCIENCES AND MATHEMATICS
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MASTER'S (2ND-CYCLE) PROGRAMMES:

The Faculty of Natural Sciences and Mathematics offers three one-discipline programmes, two one-discipline teacher training programmes and six two-discipline teacher training programmes.

- a) One-discipline master's programmes
 1. **BIOLOGY AND ECOLOGY WITH NATURE CONSERVATION**
 2. **PHYSICS**
 3. **MATHEMATICS**
- b) One-discipline teacher-training master's programmes
 4. **EDUCATIONAL MATHEMATICS**
 5. **EDUCATIONAL DESIGN**
- c) Two-discipline teacher-training master's programmes
 6. **EDUCATIONAL BIOLOGY**
 7. **EDUCATIONAL PHYSICS**
 8. **EDUCATIONAL CHEMISTRY**
 9. **EDUCATIONAL MATHEMATICS**
 10. **EDUCATIONAL COMPUTER SCIENCE**
 11. **EDUCATIONAL DESIGN**

Location: Maribor

Duration: 2 years, 120 ECTS

Combinations under two-discipline programmes:

In the context of two-discipline master's programmes offered by the Faculty of Natural Sciences and Mathematics, candidates may choose any combination of disciplines forming a whole. In the application form, candidates must specify both disciplines.

Combinations under two-discipline programmes conducted in cooperation with other faculties:

Two-discipline master's programmes offered by the Faculty of Natural Sciences and Mathematics may be combined with teacher-training or non-teacher-training master's programmes offered by the Faculty of Arts of the University of Maribor.

Candidates applying for two-discipline master's programmes conducted by the Faculty of Natural Sciences and Mathematics in cooperation with the Faculty of Arts of the University of Maribor must meet admission requirements under both programmes. Two-discipline master's programmes of the Faculty of Natural Sciences and Mathematics can be combined with the following two-discipline teacher-training master's programmes of the Faculty of Arts: Hungarian Language and Literature; German as a Foreign Language; Slovene Language and Literature; Teaching English; Geography, Philosophy, Sociology and History (see the Call for Enrolment of the Faculty of Arts). Two-discipline master's programmes of the Faculty of Natural Sciences and Mathematics can also be combined with the following two-discipline non-teacher-training master's programmes of the Faculty of Arts: Philosophy, Geography, Slovene Language and Literature, Art History, English Studies and History (see the Call for Enrolment of the Faculty of Arts).

The Faculty of Natural Sciences and Mathematics is considered the student's home institution. If a student wants the Faculty of Arts to be his/her home institution, this can be arranged upon enrolment.

Admission requirements:

1. BIOLOGY AND ECOLOGY WITH NATURE CONSERVATION

Candidates who completed the following may apply for the master's (2nd-cycle) programme BIOLOGY AND ECOLOGY WITH NATURE CONSERVATION:

- A bachelor's (1st-cycle) programme in a relevant field: biology (4211), ecology (4221), nature conservation (8521), biodiversity (4219);
- A bachelor's (1st-cycle) programme in one of the following fields: biology (4211, only educational biology), training for teachers with subject specialisation (1450, only biology), agriculture, forestry and fishery (6200), crop and livestock production (6210), forestry (6230), biology and biochemistry (4210, only microbiology and bioinformatics), biochemistry (4212), environmental protection (8500). Prior to enrolment candidates must fulfil study obligations corresponding to 20 ECTS credits under the bachelor's programme, a training programme or by taking placement tests. Candidates must fulfil the following obligations: "Botany" (5 ECTS), "Zoology" (5 ECTS), "Ecology" (5 ECTS) and "Biochemistry with Fundamentals of Microbiology and genetics" (5 ECTS);
- An undergraduate programme adopted prior to 11 June 2004 in a relevant field: biology (4211), ecology (4221). These candidates are typically awarded 60 ECTS credits and may enrol in the second year provided they satisfy the transfer criteria laid down in the accredited degree programme;
- An undergraduate programme adopted prior to 11 June 2004 in one of the following fields: environmental science (4220), agriculture, forestry and fishery (6200), crop and livestock production (6210), forestry (6230), training for teachers in natural science subjects (1451, only biology), training for teachers with subject specialisation (1450, only biology). These candidates are awarded between 10 and 60 ECTS credits and may enrol in the corresponding year.

In the selection procedure, candidates applying for the 2nd-cycle master's programme "Biology and Ecology with Nature Conservation" will be ranked according to the academic performance under the bachelor's programme:

- grade point average (100%).

Transfer criteria:

In accordance with the transfer criteria, candidates may transfer to the master's (2nd-cycle) programme "Biology and Ecology with Nature Conservation" from programmes in the field of biology, ecology, environmental protection and conservation biology provided they lead to the acquisition of comparable competencies and provided that at least half of the obligations under the former study programme relating to compulsory subjects of the new programme can be recognized.

Under the recognition process, satisfied obligations that may be recognized fully or partially are identified and new obligations required for completion of the new programme are laid down.

Mode of study: full-time

2. PHYSICS

Candidates who completed the following may apply for the master's (2nd-cycle) programme PHYSICS:

- A bachelor's (1st-cycle) programme in a relevant field: physical science (4400), physics (441, also educational physics), meteorology (4433), biophysics (4213);
- A bachelor's (1st-cycle) programme in one of the following fields: engineering and engineering trades (52), chemistry (442), earth science (4430), geology (4431), geography (natural and physical) (4432), mineralogy (4434), palaeontology (4435), seismology and volcanology (4436), earth science (other) (4439), building and civil engineering (582). Prior to enrolment, candidates must fulfil study obligations corresponding to 15 ECTS credits under the bachelor's programme, a training programme or by taking placement tests. Candidates must fulfil the following obligations: "Modern Physics" (8 ECTS), "System Dynamics Modelling" (7 ECTS);
- A bachelor's (1st-cycle) programme in another field: biology and biochemistry (4210), biology (4211), biochemistry (4212), pharmacology (4214), toxicology (4215), biology and biochemistry (other) (4219), environmental science (4220), ecology (4221), environmental science (other) (4229), mathematics and statistics (46), computer science (48). Prior to enrolment, candidates must fulfil study obligations corresponding to 41 ECTS credits under the bachelor's programme, a training programme or by taking

placement tests. Candidates must fulfil the following obligations: “Mechanics” (7 ECTS), “Thermodynamics” (5 ECTS), “Electromagnetism” (7 ECTS), “Oscillation and Waves” (7 ECTS), “Modern Physics” (8 ECTS), “System Dynamics Modelling” (7 ECTS);

- A bachelor’s vocational programme adopted prior to 11 June 2004 in a relevant field: physical science (4400), physics (441), meteorology (4433), biophysics (4213);
- A bachelor’s vocational programme adopted prior to 11 June 2004 in one of the following fields: engineering and engineering trades (52), chemistry (442), earth science (4430), geology (4431), geography (natural and physical) (4432), mineralogy (4434), palaeontology (4435), seismology and volcanology (4436), earth science (other) (4439), building and civil engineering (582). Prior to enrolment, candidates must fulfil study obligations corresponding to 15 ECTS credits under the bachelor’s programme, a training programme or by taking placement tests. Candidates must fulfil the following obligations: “Modern Physics” (8 ECTS), “System Dynamics Modelling” (7 ECTS);
- A bachelor’s vocational programme adopted prior to 11 June 2004 in one of the following fields: biology and biochemistry (4210), biology (4211), biochemistry (4212), pharmacology (4214), toxicology (4215), biology and biochemistry (other) (4219), environmental science (4220), ecology (4221), environmental science (other) (4229), mathematics and statistics (46), computer science (48). Prior to enrolment, candidates must fulfil study obligations corresponding to 41 ECTS credits under the bachelor’s programme, a training programme or by taking placement tests. Candidates must fulfil the following obligations: “Mechanics” (7 ECTS), “Thermodynamics” (5 ECTS), “Electromagnetism” (7 ECTS), “Oscillation and Waves” (7 ECTS), “Modern Physics” (8 ECTS), “System Dynamics Modelling” (7 ECTS);
- An undergraduate programme adopted prior to 11 June 2004 in a relevant field: training for teachers with subject specialisation (1450, only physics), physical science (4400), physics (441, also educational physics), meteorology (4433), biophysics (4213). These candidates are typically awarded 60 ECTS credits and may enrol in the second year provided they satisfy the transfer criteria laid down in the accredited degree programme;
- An undergraduate programme adopted prior to 11 June 2004 in one of the following fields: training for teachers in natural science subjects (1451, only physics), training for teachers with subject specialisation (1450, only physics). These candidates are typically awarded 10 ECTS credits;
- A bachelor’s vocational programme adopted prior to 11 June 2004 and a specialisation programme adopted prior to 11 June 2004 in a relevant field: physical science (4400), physics (441, also educational physics), meteorology (4433), biophysics (4213). These candidates are typically awarded 60 ECTS credits and may enrol in the second year provided they satisfy the transfer criteria laid down in the accredited degree programme.

In the selection procedure, candidates applying for the 2nd-cycle master’s programme “Physics” will be ranked according to the academic performance under the bachelor’s programme:

- grade point average (100%).

Transfer criteria:

In accordance with the transfer criteria, candidates may transfer to the master’s (2nd-cycle) programme “Physics” from programmes in the field of physical science, educational physics, physics, meteorology and biophysics provided they lead to the acquisition of comparable competencies and provided that at least half of the obligations under the former study programme relating to compulsory subjects of the new programme can be recognized.

Under the recognition process, satisfied obligations that may be recognized fully or partially are identified and new obligations required for completion of the new programme are laid down.

Mode of study: full-time

3. MATHEMATICS

Candidates who completed the following may apply for the master’s (2nd-cycle) programme MATHEMATICS:

- A bachelor’s (1st-cycle) programme in the relevant field: mathematics (4610).
- A bachelor’s (1st-cycle) programme in one of the following fields: mathematics (4610, only educational mathematics), training for teachers with subject specialisation (1450, only mathematics). Prior to enrolment, candidates must fulfil study obligations corresponding to 23 ECTS credits under the bachelor’s programme, a training programme or by taking placement tests. Candidates must fulfil the following obligations: “Algebra” (8 ECTS), “Discrete Mathematics I” (7 ECTS), “Numerical Methods and Symbolic Mathematics” (8 ECTS);
- A bachelor’s (1st-cycle) programme in one of the following fields: mathematics (4610, only practical mathematics). Prior to enrolment, candidates must fulfil study obligations corresponding to 24 ECTS credits under the bachelor’s programme, a training programme or by taking placement tests. Candidates must fulfil the following obligations: “Algebra” (8 ECTS), “Plane and Solid Geometry” (7 ECTS), “Analysis III” (9 ECTS);

- A bachelor's (1st-cycle) programme in one of the following fields: life sciences (42), physical sciences (44), computer science (481), engineering and engineering trades (52), economics (314). Prior to enrolment, the candidate must fulfil study obligations corresponding to 55 ECTS credits under a bachelor's programme, training programme or by taking placement tests. Candidates must fulfil the following obligations: "Analysis II" (8 ECTS), "Algebra" (8 ECTS), "Discrete Mathematics I" (7 ECTS), "Analysis III" (9 ECTS), "Analysis IV" (8 ECTS), "Algorithms" (7 ECTS), "Probability" (8 ECTS);
- An undergraduate programme adopted prior to 11 June 2004 in the relevant field: mathematics (4610). These candidates are typically awarded 60 ECTS credits and may enrol in the second year provided they satisfy the transfer criteria laid down in the accredited degree programme;
- An undergraduate programme adopted prior to 11 June 2004 in one of the following fields: training for teachers in natural science subjects (1451, only mathematics, computer science with mathematics), training for teachers with subject specialisation (1450, only mathematics). These candidates are typically awarded between 10 ECTS and 60 credits.

In the selection procedure, candidates applying for the 2nd-cycle master's programme "Mathematics" will be ranked according to the academic performance under the bachelor's programme:

- grade point average (100%).

Transfer criteria:

In accordance with the transfer criteria, candidates may transfer to the master's (2nd-cycle) programme "Mathematics" from programmes in the field of mathematics provided they lead to the acquisition of comparable competencies and provided that at least half of the obligations under the former study programme relating to compulsory subjects of the new programme can be recognized.

Under the recognition process, satisfied obligations that may be recognized fully or partially are identified and new obligations required for completion of the new programme are laid down.

Mode of study: full-time

4. EDUCATIONAL MATHEMATICS

Candidates who completed the following may apply for the one-discipline teacher-training master's programme EDUCATIONAL MATHEMATICS:

- A bachelor's (1st-cycle) programme in the relevant field: mathematics (4610);
- A bachelor's (1st-cycle) programme in one of the following fields: mathematics (4610, only educational mathematics), training for teachers with subject specialisation (1450, only mathematics). Prior to enrolment, candidates must fulfil study obligations corresponding to 23 ECTS credits under the bachelor's programme, a training programme or by taking placement tests. Candidates must fulfil the following obligations: "Algebra" (8 ECTS), "Discrete Mathematics I" (7 ECTS), "Numerical Methods and Symbolic Mathematics" (8 ECTS);
- A bachelor's (1st-cycle) programme in one of the following fields: mathematics (4610, only practical mathematics). Prior to enrolment, the candidate must fulfil study obligations corresponding to 24 ECTS credits under a bachelor's programme, training programme or by taking placement tests. Candidates must fulfil the following obligations: "Algebra" (8 ECTS), "Plane and Solid Geometry" (7 ECTS), "Analysis III" (9 ECTS);
- An undergraduate programme adopted prior to 11 June 2004 in the relevant field: mathematics (4610). These candidates are typically awarded 60 ECTS credits and may enrol in the second year provided they satisfy the transfer criteria laid down in the accredited degree programme;
- An undergraduate programme adopted prior to 11 June 2004 in one of the following fields: training for teachers in natural science subjects (1451, mathematics, computer science with mathematics), training for teachers with subject specialisation (1450, only mathematics). These candidates are typically awarded between 30 ECTS and 60 credits and may enrol in the corresponding year.

In the selection procedure, candidates applying for the 2nd-cycle master's programme "Educational Mathematics" will be ranked according to the academic performance under the bachelor's programme:

- grade point average (100%).

Transfer criteria:

In accordance with the transfer criteria, candidates may transfer to the one-discipline teacher-training master's programme "Educational Mathematics" from programmes in the field of mathematics provided they lead to the

acquisition of comparable competencies and provided that at least half of the obligations under the former study programme relating to compulsory subjects of the new programme can be recognized.

Under the recognition process, satisfied obligations that may be recognized wholly or partly are identified and new obligations required for completion of the new programme are laid down. Students must obtain a minimum of 60 ECTS credits in terms of pedagogical, psychological and didactical courses in order to be awarded a master's degree.

Mode of study: full-time

5. EDUCATIONAL DESIGN

Candidates who completed the following may apply for the one-discipline teacher-training master's programme EDUCATIONAL DESIGN:

- A bachelor's (1st-cycle) programme in the relevant field: engineering and engineering trades (52, also educational engineering);
- A bachelor's (1st-cycle) programme in one of the following fields: physics and astronomy (441), chemistry (442), mathematics (461), computer science (481), applied computer science (482), materials science and engineering (wood, paper, plastic, glass) (543), civil engineering (582), economics (314), training for class teachers (1441). Prior to enrolment, candidates must fulfil study obligations corresponding to 24 ECTS credits under the bachelor's programme, a training programme or by taking placement tests. Candidates must fulfil the following obligations: "Materials and Technologies" (6 ECTS), "Technical Drawing" (6 ECTS), "Mechanical Elements" (6 ECTS), "Electrical Engineering" (6 ECTS);
- A bachelor's vocational programme adopted prior to 11 June 2004 in the relevant field: engineering and engineering trades (52);
- A bachelor's vocational programme adopted prior to 11 June 2004 in a relevant field: physics (440), mathematics (461), computer science (481), applied computer science (482), civil engineering (582), materials science and engineering (wood, paper, plastic, glass) (543). Prior to enrolment, candidates must fulfil study obligations corresponding to 24 ECTS credits under the bachelor's programme, a training programme or by taking placement tests. Candidates must fulfil the following obligations: "Materials and Technologies" (6 ECTS), "Technical Drawing" (6 ECTS), "Mechanical Elements" (6 ECTS), "Electrical Engineering" (6 ECTS);
- An undergraduate programme adopted prior to 11 June 2004 in a relevant field: training for teachers in natural science subjects (1451, production and engineering subjects only), training for teachers with subject specialisation (1450, only educational design). These candidates are typically awarded 60 ECTS credits and may enrol in the second year provided they satisfy the transfer criteria laid down in the accredited degree programme;
- An undergraduate programme adopted prior to 11 June 2004 in one of the following fields: training for teachers in natural science subjects (1451, biology, physics, chemistry, mathematics, computer science, computer science with mathematics only), training for teachers with subject specialisation (1450, only biology, physics, chemistry, mathematics, computer science). These candidates are typically awarded 30 ECTS and may enrol in the corresponding year;
- An undergraduate programme adopted prior to 11 June 2004 in one of the following fields: engineering and engineering trades (52), physics (440), chemistry (442), mathematics (461), computer science (481), applied computer science (482), economics (314), civil engineering (582), architecture and town planning (581), materials science and engineering (wood, paper, plastic, glass) (543), training for teachers in basic education (144), training for teachers with subject specialization (145), training for teachers in vocational and practical courses (146). These candidates are awarded 10 ECTS credits;
- A bachelor's vocational programme adopted prior to 11 June 2004 and a specialisation programme adopted prior to 11 June 2004 in one of the following fields: engineering and engineering trades (52). These candidates are typically awarded 10 ECTS credits.

In the selection procedure, candidates applying for the 2nd-cycle master's programme "Educational Design" will be ranked according to the academic performance under the bachelor's programme:

- grade point average (100%).

Transfer criteria:

In accordance with the transfer criteria, candidates may transfer to the one-discipline teacher-training master's programme "Educational Design" from programmes in the field of natural sciences, engineering and similar fields provided they lead to the acquisition of comparable competencies and provided that at least half of the obligations under the former study programme relating to compulsory subjects of the new programme can be recognized.

Under the recognition process, satisfied obligations that may be recognized fully or partially are identified and new obligations required for completion of the new programme are laid down. Students must obtain a minimum of 60 ECTS credits in order to be awarded a master's degree.

Mode of study: part-time

The study programme will be implemented if two (2) or more candidates apply for the programme.

6. EDUCATIONAL BIOLOGY

Candidates who completed the following may apply for the two-discipline teacher-training master's programme EDUCATIONAL BIOLOGY:

- A bachelor's (1st-cycle) programme in a relevant field: biology (4211, educational biology only), training for teachers with subject specialisation (1450, biology only);
- An undergraduate programme adopted prior to 11 June 2004 in a relevant field: training for teachers in natural science subjects (1451, biology only), training for teachers with subject specialisation (1450, biology only). The candidates are typically awarded 30 ECTS credits and a corresponding number of ECTS credits under the second two-discipline programme and may enrol in the second year provided they satisfy the transfer criteria laid down in the accredited degree programme.

In the selection procedure, candidates applying for the 2nd-cycle master's programme "Educational Biology" will be ranked according to the academic performance under the bachelor's programme:

- grade point average (100%).

Transfer criteria:

In accordance with the transfer criteria, candidates may transfer to the two-discipline teacher-training master's programme "Educational Biology" from two-discipline programmes in the field of biology (second discipline is irrelevant) provided they lead to the acquisition of comparable competencies and provided that at least half of the obligations under the former study programme relating to compulsory subjects of the new programme can be recognized.

Under the recognition process, satisfied obligations that may be recognized fully or partially are identified and new obligations required for completion of the new programme are laid down. Students must obtain a minimum of 60 ECTS credits in order to be awarded a master's degree.

Mode of study: full-time

7. EDUCATIONAL PHYSICS

Candidates who completed the following may apply for the two-discipline teacher-training master's programme EDUCATIONAL PHYSICS:

- A bachelor's (1st-cycle) programme in a relevant field: physics (4411, educational physics only), training for teachers with subject specialisation (1450, physics only);
- An undergraduate programme adopted prior to 11 June 2004 in a relevant field: training for teachers in natural science subjects (1451, physics only), training for teachers with subject specialisation (1450, physics only). The candidates are typically awarded 30 ECTS credits and a corresponding number of ECTS credits under the second two-discipline programme and may enrol in the second year provided they satisfy the transfer criteria laid down in the accredited degree programme.

In the selection procedure, candidates applying for the 2nd-cycle master's programme "Educational Physics" will be ranked according to the academic performance under the bachelor's programme:

- grade point average (100%).

Transfer criteria:

In accordance with the transfer criteria, candidates may transfer to the two-discipline teacher-training master's programme "Educational Physics" from programmes in the field of physics science, physics, meteorology and biophysics provided they lead to the acquisition of comparable competencies and provided that at least half of the

obligations under the former study programme relating to compulsory subjects of the new programme can be recognized.

Under the recognition procedure, satisfied obligations that may be recognized fully or partially are identified and new obligations required for completion of the new programme are laid down. Students must obtain a minimum of 60 ECTS credits in order to be awarded a master's degree.

Mode of study: full-time

8. EDUCATIONAL CHEMISTRY

Candidates who completed the following may apply for the two-discipline teacher-training master's programme EDUCATIONAL CHEMISTRY:

- A bachelor's (1st-cycle) programme in a relevant field: chemistry (4420, educational chemistry only), training for teachers with subject specialisation (1450, chemistry only);
- An undergraduate programme adopted prior to 11 June 2004 in a relevant field: training for teachers in natural science subjects (1451, chemistry only), training for teachers with subject specialisation (1450, chemistry only). The candidates are typically awarded 30 ECTS credits and a corresponding number of ECTS credits under the second two-discipline programme and may enrol in the second year provided they satisfy the transfer criteria laid down in the accredited degree programme.

In the selection procedure, candidates applying for the 2nd-cycle master's programme "Educational Chemistry" will be ranked according to the academic performance under the bachelor's programme:

- grade point average (100%).

Transfer criteria:

In accordance with the transfer criteria, candidates may transfer to the two-discipline pedagogical master's programme "Educational Chemistry" from two-discipline programmes in the field of chemistry (second discipline is irrelevant) provided they lead to the acquisition of comparable competencies and provided that at least half of the obligations under the former study programme relating to compulsory subjects of the new programme can be recognized.

Under the recognition process, satisfied obligations that may be recognized fully or partially are identified and new obligations required for completion of the new programme are laid down. Students must obtain a minimum of 60 ECTS credits in order to be awarded a master's degree.

Mode of study: full-time

9. EDUCATIONAL MATHEMATICS

Candidates who completed the following may apply for the two-discipline teacher-training master's programme EDUCATIONAL MATHEMATICS:

- A bachelor's (first-cycle) programme in a relevant field: mathematics (4610, educational only mathematics), training for teachers with subject specialisation (1450, mathematics only);
- A bachelor's (first-cycle) programme in the following field: mathematics (4610, mathematics only). Candidates must fulfil study obligations corresponding to 14 ECTS credits under the bachelor's programme, a training programme or by taking qualifying exams prior to enrolment. Candidates must fulfil the following obligations: "Psychology of Development and Learning" (6 ECTS), "Pedagogy" (4 ECTS) and "Didactics" (4 ECTS);
- A bachelor's (first-cycle) programme in one of the following fields: computer science and informatics (4811, only computer science and information technology), computer science (4810, computer science and informatics only), mathematics (4610, computer science and mathematics only). Candidates must fulfil study obligations corresponding to 42 ECTS credits under the bachelor's programme, a training programme or by taking qualifying exams prior to enrolment. Candidates must fulfil the following obligations: "Algebraic Structures" (6 ECTS), "Plane and Solid Geometry" (6 ECTS), "Combinatorics and Probability" (4 ECTS), "Number Theory" (6 ECTS), "Selected Topics in Analysis" (6 ECTS), "Psychology of Development and Learning" (6 ECTS), "Pedagogy" (4 ECTS) and "Didactics" (4 ECTS);

- An undergraduate programme adopted prior to 11 June 2004 in a relevant field: training for teachers in natural science subjects (1451, mathematics, computer science with mathematics only), training for teachers with subject specialisation (1450, mathematics only). These candidates are typically awarded 30 ECTS credits and a corresponding number of ECTS credits under the second discipline and may enrol in the second year provided they satisfy the transfer criteria laid down in the accredited degree programme;
- A bachelor's vocational programme adopted prior to 11 June 2004 in the following field: mathematics (4610). Candidates must fulfil study obligations corresponding to 26 ECTS credits under the bachelor's programme, a training programme or by taking qualifying exams prior to enrolment. Candidates must fulfil the following obligations: "Plane and Solid Geometry" (6 ECTS), "Number Theory" (6 ECTS), "Psychology of Development and Learning" (6 ECTS), "Pedagogy" (4 ECTS) and "Didactics" (4 ECTS);

In the selection procedure, candidates applying for the 2nd-cycle master's programme "Educational Mathematics" will be ranked according to the academic performance under the bachelor's programme:

- grade point average (100%).

Transfer criteria:

In accordance with the transfer criteria, candidates may transfer to the two-discipline teacher-training master's programme "Educational Mathematics" from programmes in the field of mathematics (broad programmes) provided they lead to the acquisition of comparable competencies and provided that at least half of the obligations under the former study programme relating to compulsory subjects of the new programme can be recognized.

Under the recognition process, satisfied obligations that may be recognized fully or partially are identified and new obligations required for completion of the new programme are laid down. Students must obtain a minimum of 60 ECTS credits from courses in pedagogy, psychology and didactics in order to be awarded a master's degree.

Mode of study: full-time

10. EDUCATIONAL COMPUTER SCIENCE

Candidates who completed the following may apply for the two-discipline teacher-training master's programme EDUCATIONAL COMPUTER SCIENCE:

- A bachelor's (first-cycle) programme in a relevant field: computer science (4810, educational computer science only), training for teachers with subject specialisation (1450, computer science only);
- A bachelor's (first-cycle) programme in one of the following fields: computer science and informatics (4811, computer science and information technology only), computer science (4810, computer science and informatics only), mathematics (4610, computer science and mathematics only). Candidates must fulfil study obligations corresponding to 14 ECTS credits under the bachelor's programme, a training programme or by taking qualifying exams prior to enrolment. Candidates must fulfil the following obligations: "Psychology of Development and Learning" (6 ECTS), "Pedagogy" (4 ECTS), "Didactics" (4 ECTS);
- A bachelor's (first-cycle) in the following field: mathematics (4610, mathematics only). Candidates must fulfil study obligations corresponding to 30 ECTS credits under the bachelor's programme, a training programme or by taking qualifying exams prior to enrolment. Candidates must fulfil the following obligations: "Fundamentals of Computer Science and Informatics" (7 ECTS), "Programming II" (6 ECTS), "Algorithms and Data Structures" (6 ECTS), "Fundamentals of Databases" (4 ECTS), "Psychology of Development and Learning" (6 ECTS), "Pedagogy" (4 ECTS), "Didactics" (4 ECTS);
- A bachelor's vocational programme adopted prior to 11 June 2004 in the following field: computer science (4810). Candidates must fulfil study obligations corresponding to 14 ECTS credits under the bachelor's programme, a training programme or by taking qualifying exams prior to enrolment. Candidates must fulfil the following obligations: "Psychology of Development and Learning" (6 ECTS), "Pedagogy" (4 ECTS), "Didactics" (4 ECTS);
- A bachelor's vocational programme adopted prior to 11 June 2004 in the following field: mathematics (4610). Candidates must fulfil study obligations corresponding to 30 ECTS credits under the bachelor's programme, a training programme or by taking qualifying exams prior to enrolment. Candidates must fulfil the following obligations: "Fundamentals of Computer Science and Informatics" (7 ECTS), "Programming II" (6 ECTS), "Algorithms and Data Structures" (6 ECTS), "Fundamentals of Databases" (4 ECTS), "Psychology of Development and Learning" (6 ECTS), "Pedagogy" (4 ECTS), "Didactics" (4 ECTS);
- An undergraduate programme adopted prior to 11 June 2004 in one of the following fields: training for teachers in natural science subjects (1451, computer science, computer science with mathematic only), training for teachers with subject specialisation (1450, computer science only). These candidates are

typically awarded 30 ECTS credits and a corresponding number of ECTS credits under the second discipline and may enrol in the second year provided they satisfy the transfer criteria laid down in the accredited degree programme.

- An undergraduate programme adopted prior to 11 June 2004 in one of the following fields: computer science and informatics (4811), computer science (4810), mathematics (4610, computer science and mathematics only). These candidates are typically awarded 10 ECTS credits and a corresponding number of ECTS credits under the discipline and may enrol in the corresponding year.

In the selection procedure, candidates applying for the 2nd-cycle master's programme "Educational Mathe Computer Science" will be ranked according to the academic performance under the bachelor's programme:

- grade point average (100%).

Transfer criteria:

In accordance with the transfer criteria, candidates may transfer to the two-discipline teacher-training master's programme "Educational Computer Science" from programmes in the field of computer science, engineering and mathematics provided they lead to the acquisition of comparable competencies and provided that at least half of the obligations under the former study programme relating to compulsory subjects of the new programme can be recognized.

Under the recognition process, satisfied obligations that may be recognized fully or partially are identified and new obligations required for completion of the new programme are laid down. Students must obtain a minimum of 60 ECTS credits from courses in psychology, pedagogy and didactics in order to be awarded a master's degree.

Mode of study: full-time

11. EDUCATIONAL DESIGN

Candidates who completed the following may apply for the two-discipline teacher-training master's programme EDUCATIONAL DESIGN:

- A bachelor's (1st-cycle) programme in a relevant field: engineering and engineering trades (5200, educational engineering only), training for teachers with subject specialisation (1450, engineering only);
- An undergraduate programme adopted prior to 11 June 2004 in the relevant field: training for teachers with subject specialisation (1450, educational design, engineering only). The candidates are typically awarded 30 ECTS credits and a corresponding number of ECTS credits under the second two-discipline programme and may enrol in the second year provided they satisfy the transfer criteria laid down in the accredited degree programme.

In the selection procedure, candidates applying for the 2nd-cycle master's programme "Educational Design" will be ranked according to the academic performance under the bachelor's programme:

- grade point average (100%).

Transfer criteria:

In accordance with the transfer criteria, candidates may transfer to the two-discipline teacher-training master's programme "Educational Design" from programmes in the field of natural science, engineering and similar sciences provided they lead to the acquisition of comparable competencies and provided that at least half of the obligations under the former study programme relating to compulsory subjects of the new programme can be recognized.

Under the recognition process, satisfied obligations that may be recognized fully or partially are identified and new obligations required for completion of the new programme are laid down. Students must obtain a minimum of 60 ECTS credits in order to be awarded a master's degree.

Mode of study: full-time

DOCTORAL (3RD-CYCLE) PROGRAMMES

The Faculty of Natural Sciences and Mathematics offers four doctoral (3rd-cycle) programmes:

1. ECOLOGICAL SCIENCES
2. PHYSICS
3. MATHEMATICS
4. EDUCATION IN ENGINEERING

Location: Maribor

Duration: 3 years, 180 ECTS

Admission requirements:

1. ECOLOGICAL SCIENCES

Candidates who completed the following may apply for the doctoral (3rd-cycle) programme ECOLOGICAL SCIENCES:

- A master's (2nd-cycle) programme;
- An undergraduate programme adopted prior to 11 June 2004;
- A bachelor's vocational programme adopted prior to 11 June 2004 and a specialisation programme. Prior to enrolment, these candidates must fulfil study obligations corresponding to 60 ECTS in the field of biology, ecology and/or other natural sciences and general courses;
- study programme educating students for professions regulated by EU directives or another master's programme corresponding to 300 ECTS credits.

In order to successfully complete the PhD programme, candidates are advised to apply only if they obtained a graduate education in the field of ecology, biology, nature conservation, veterinary science, agriculture, forestry or medicine.

In the event of limited enrolment, the Faculty will publish the selection criteria in accordance with Article 41 of the Higher Education Act. In the selection procedure, the academic performance under the master's programme (grade point average – 20%, grade awarded for the master's thesis – 40%) as well as the grade in the elective exam (40%) shall be taken into account. Taking into account the candidate's previous knowledge, the elective exam is determined from basic biological and ecological contents, the knowledge of which is essential for completion of the programme.

Transfer criteria:

In accordance with the transfer criteria, candidates may transfer to the doctoral (3rd-cycle) programme "Ecological Sciences" from doctoral (3rd-cycle) programmes in the field of biology, ecology, nature conservation, geography, biotechnology (veterinary science, agriculture, forestry) and medicine provided they lead to the acquisition of comparable competencies and provided that at least half of the obligations under the former study programme relating to compulsory subjects of the new programme can be recognized. The Faculty's Academic Affairs Committee determines missing study obligations to be fulfilled in order to earn a PhD degree under the new programme.

In accordance with Article 5 of the Transfer Criteria, candidates from non-Bologna programmes who completed the following may also be admitted to the doctoral (3rd-cycle) programme "Ecological Sciences":

1. A master's programme (MSc) adopted prior to 11 June 2004 – these candidates are awarded a minimum of 60 ECTS credits;
2. An undergraduate programme adopted prior to 11 June 2004 and a specialisation programme – these candidates are awarded a minimum of 60 ECTS credits.

Mode of study: part-time

The study programme will be implemented if one or more candidates apply for the programme.

Detailed information:

Assist. prof. dr. Tina Klenovšek

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Candidates who completed the following may apply for the doctoral (3rd-cycle) programme PHYSICS:

- A master's (2nd-cycle) programme;
- An undergraduate programme adopted prior to 11 June 2004;
- A bachelor's vocational programme adopted prior to 11 June 2004 and a specialisation programme. Prior to enrolment, these candidates must fulfil study obligations corresponding to 35 ECTS: "Statistical Thermodynamics" (8 ECTS), "Physics Modelling" (10 ECTS), "Physics of Complex Systems" (7 ECTS), "Introduction to Scientific Research" (10 ECTS);
- study programme educating students for professions regulated by EU directives or another master's programme corresponding to 300 ECTS credits.

In order to successfully complete the PhD programme, candidates are advised to apply only if they obtained a graduate education in the field of physics or if they possess previous knowledge of physics at the university level.

In the event of limited enrolment, the Faculty will publish the selection criteria in accordance with Article 41 of the Higher Education Act. In the selection procedure, the academic performance under the master's programme (grade point average – $\frac{1}{4}$; awarded for the master's thesis – $\frac{1}{4}$) as well as the grade in the elective exam "Overview of Classical and Modern Physics" ($\frac{1}{2}$) shall be taken into account.

Transfer criteria:

In accordance with the transfer criteria, candidates may transfer to the doctoral (3rd-cycle) programme "Physics" from doctoral (3rd-cycle) programmes in the field of physical sciences, natural sciences and mathematics and engineering provided they lead to the acquisition of comparable competencies and provided that at least half of the obligations under the former study programme relating to compulsory subjects of the new programme can be recognized. The Faculty's Academic Affairs Committee determines missing study obligations to be fulfilled in order to earn a PhD degree under the new programme.

In accordance with Article 5 of the Transfer Criteria, candidates from non-Bologna programmes who completed the following may also be admitted to the Bologna doctoral (3rd-cycle) programme "Physics":

3. A master's programme (MSc) adopted prior to 11 June 2004 – these candidates are awarded 60 ECTS credits;
4. An undergraduate programme adopted prior to 11 June 2004 and a specialisation programme – these candidates are awarded 60 ECTS credits.

Mode of study: part-time

The study programme will be implemented in the event of one or more candidates.

Detailed information:

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or

Prof. dr. Samo Kralj

Phone: 02 2293 897**Email:** samo.kralj@um.si**3. MATHEMATICS**

Candidates who completed the following may apply for the doctoral (3rd-cycle) programme MATHEMATICS:

- A master's (2nd-cycle) programme;
- An undergraduate programme adopted prior to 11 June 2004;
- A bachelor's vocational programme adopted prior to 11 June 2004 and a specialisation programme. Prior to enrolment, these candidates must fulfil study obligations corresponding to 45 ECTS. Candidates must pass

- exams from the narrow field of mathematics analysis, algebra, discrete mathematics, geometry, topology, probability and statistics;
- study programme educating students for professions regulated by EU directives or another master's programme corresponding to 300 ECTS credits.

In order to successfully complete the PhD programme, candidates are advised to apply only if they obtained a graduate education in the field of mathematics or natural sciences.

In the event of limited enrolment, the Faculty will publish the selection criteria in accordance with Article 41 of the Higher Education Act. In the selection procedure, candidates will be ranked according to:

- grade point average (20%);
- grade awarded for the master's thesis (40%);
- grade in the elective exam (40%).

The elective exam focuses on basic mathematical contents, the knowledge of which is essential for completion of the programme.

Transfer criteria:

In accordance with the transfer criteria, candidates may transfer to the doctoral (3rd-cycle) programme "Mathematics" from doctoral (3rd-cycle) programmes in the field of mathematics provided they lead to the acquisition of comparable competencies and provided that at least half of the obligations under the former study programme relating to compulsory subjects of the new programme can be recognized. The Faculty's Academic Affairs Committee determines missing study obligations to be fulfilled in order to earn a PhD degree under the new programme.

In accordance with Article 5 of the Transfer Criteria, candidates from non-Bologna programmes who completed the following may also be admitted to the Bologna doctoral (3rd-cycle) programme "Mathematics":

5. A master's programme (MSc) adopted prior to 11 June 2004 – these candidates are awarded a minimum of 60 ECTS;
6. An undergraduate programme adopted prior to 11 June 2004 and a specialisation programme – these candidates are awarded a minimum of 60 ECTS.

Mode of study: part-time

The study programme will be implemented in the event of one or more candidates.

Detailed information:

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4. EDUCATION IN ENGINEERING

Candidates who completed the following may apply for the doctoral (3rd-cycle) programme EDUCATION IN ENGINEERING:

- A master's (2nd-cycle) programme;
- An undergraduate programme adopted prior to 11 June 2004;
- A bachelor's vocational programme adopted prior to 11 June 2004 and a specialisation programme. Prior to enrolment, these candidates must fulfil study obligations corresponding to 60 ECTS, which are determined by the Department of Technical Education by taking into account the track under the vocational or specialisation programme;
- study programme educating students for professions regulated by EU directives or another master's programme corresponding to 300 ECTS credits.

In the event of limited enrolment, the Faculty will publish the selection criteria in accordance with Article 41 of the Higher Education Act. In the selection procedure, the academic performance under the master's programme (grade point average – 30%; awarded for the master's thesis – 30%) as well as the grade in the elective exam (40%). The elective exam is determined from basic engineering and pedagogical contents, the knowledge of which is essential for completion of the doctoral programme.

Transfer criteria:

In accordance with the transfer criteria, candidates may transfer to the doctoral (3rd-cycle) programme “*Education in Engineering*” from doctoral (3rd-cycle) programmes in the field of natural sciences, engineering, economics, environmental sciences, social sciences and humanities provided they lead to the acquisition of comparable competencies and provided that at least half of the obligations under the former study programme relating to compulsory subjects of the new programme can be recognized. The Faculty’s Academic Affairs Committee determines missing study obligations to be fulfilled in order to earn a PhD degree under the new programme.

In accordance with Article 5 of the Transfer Criteria, candidates from non-Bologna programmes who completed the following may also be admitted to the Bologna doctoral (3rd-cycle) programme “Education in Engineering”:

1. A master’s programme (MSc) adopted prior to 11 June 2004 – these candidates are awarded a minimum of 60 ECTS credits;
2. A postgraduate programme adopted prior to 11 June 2004 and a specialisation programme – these candidates are awarded a minimum of 60 ECTS credits.

Mode of study: part-time

The study programme will be implemented if one or more candidates apply for the programme.

Detailed information:

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Number of available positions: The number of positions available is published in a table, which is attached to and represents an integral part of the call text.