University of Maribor
Faculty of Natural Sciences and Mathematics

Information on the pedagogical single Master study programme Educational Physics

QUALIFICATION AWARDED

Single major pedagogical Master study programme Educational Physics
Qualification awarded: Magister profesor fizike (literal translation: Master teacher of Physics)
Duration of study: 2 years

ADMISSION REQUIREMENTS

Students who have graduated from the following undergraduate university programme can enrol into the Master programme:
- undergraduate study programme of field Physics (Physics, Educational Physics, minimum 180 ECTS),
- undergraduate study programme of the related natural science field or mathematics or engineering or technology (minimum 180 ECTS). Student has to pass an examination in Modern Physics (7 ECTS) before the enrolement.
- highschool expert study programme approved before 11 June 2004 of field Physics.
- highschool expert study programme approved before 11 June 2004 of the related natural science field or mathematics or engineering or technology. Student has to pass an examination in Modern Physics (7 ECTS) before the enrolement.

Transitions between different programs are possible in accordance with Law of Higher Education, Measures for transitions between study programs and others regulations.

According to Measures for transitions between study programs the following candidates can enrol in the 2nd year of the Single Major Educational Physics program:

- Bachelor of the university study program Single or Double Major pedagogical Physics approved before 11th June 2004. Candidate receives 60 ECTS.
- Bachelor of the university study program Physics approved before 11th June 2004. Candidate receives 60 ECTS. The student is presented with the obligatories, which are necessary to graduate on the 2nd degree study program Educational Physics.
- Candidate, who finished higher education expert programme and additional programme to receive specialization in Physics; candidate receives 30 ECTS. The student is presented with the obligatories, which are necessary to graduate on the 2nd degree study program Educational Physics.

Transitions in the 2nd year of the Single Major Educational Physics program from others programs of 2nd degree in related natural science field or mathematics or engineering or technology are possible in accordance with admission requirements and sufficient number of available posts.

Before the enrolment students' obligations fulfilled in the previous study are checked and might be recognised in the new programme. The certificate from the previous study and certificate of the passed exams has to be provided. On this basis a list of obligations required to finish the new programme is defined.

EDUCATIONAL AND PROFESSIONAL GOALS

The study program is meant for educating future teachers of Physics in the elementary and secondary schools including grammar schools. The basic goal is to give the graduates a wide knowledge of Physics as well as the knowledge from didactics, psychology and pedagogy which qualify them for teaching.

The study program qualifies the graduates for organization and planning of work in the classroom. The graduates also master communication skills and work and tasks outside the classroom (teacher as a mentor, tutor and social partner) and they obtain didactical competences for teaching Physics.

The obligatory courses in the single major pedagogical study program Educational Physics ensure the appropriate and complete topics from the field of natural sciences, which are connected to the actual questions of development in Physics. The elective courses include predominantly the topics from the field of pedagogic and didactics. Thus the program is interdisciplinary and it gives a wide basic education from the field of Physics and the knowledge from the field of didactics, psychology and pedagogy. These qualifications widen the employment spectra of the graduates to all the fields where the ability of a thoughtful, tolerant and democratic work and understanding with people is needed.

The main general competences achieved by the graduates:

- Understanding and use of the curricula theories and basic didactical knowledge,
- Ability of analysis, synthesis and prediction of solutions in the field of didactical and expert knowledge,
- Interdisciplinary linking of topics,
- Ability to use knowledge in practice for solving different problems,
- Capability of creative thinking and its stimulation in pupils,
- Ability to use the research approach when solving problems and responsibility for the personal professional development in the process of the life-long-learning,
- Ability of creative and autonomous work,
- Knowledge and understanding of the development rules, differences and needs of individuals and groups,
- Knowledge and understanding of the multicultural differences and obliging to the non-discriminatory work,
- Ability to use the research approach both in the professional knowledge as well as in education,
- Ability to use information-communication technologies (ICT) in teaching and other work as well as the development of informational literacy with pupils,
- Capability of an expert dialog, international collaboration and leading of the projects,
- Ability to reflect on work and its evaluation,
- Good knowledge of the profession and the legislation applying to the school system.

The main specific competences achieved by the graduates:

- Ability to use the natural science thinking for quantitative and qualitative study of problems in nature, environment and society,

- ability in appropriate expert teaching of pupils in the field of Physics,
- knowledge and use of the appropriate scientific language,
- professional knowledge of the curricula, topics and concepts of the secondary and elementary school subjects which include topics from Physics, which enables the establishment of such educational environment where pupils can build high quality knowledge (permanence, transferability, integrity of knowledge),
- knowledge of the specific parts of educational process in Physics: experimental work, preparation of project days, leading of activities (also in Astronomy), tutorship at research work, interdisciplinary planning and conduction of lessons,
- autonomous evaluation, selection and use of the existing teaching material, didactical accessories and ICT in teaching Physics,
- ability to confront with new challenges in the teaching procedures, e.g. e-learning,
- knowledge of modern trends in teaching Physics and its use in the classroom,
- capability of analytical thinking and understanding of elaborate systems, which enables collaboration in different interdisciplinary groups,
- organization and leading of Physics education.

ACCESS TO FURTHER STUDIES

The graduate of the single major pedagogical Master study programme Educational Physics can enrol in any PhD study programme.

COURSE STRUCTURE DIGRAM WITH CREDITS

Complete curricula of the single major pedagogical Master study programme Educational Physics 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
IMW - individual mentor work

Single major pedagogical Master study programme Educational Physics

1st year, 1st semester

Course number	Course title	L /EL	S	T	LW	FW	Total contact hours	Individual work	Total hours/ ECTS
1	Didactics of Physics 1	60	15				75	105	180/6
2	Didactics of Astronomy	30			15	30	75	75	150/5
3	Selected topics from Physics	30	15	15			60	180	240/8
4	Projects in Physics Education and Tutorial Work	15	15				30	180	210/7
5	Working with children with special needs	30		30			60	60	120/4
	Cummulative	165	45	45	15	30	300	600	900/30

1st year, 2nd semester

Course number	Course title	L /EL	S	T	LW	IMW	Total contact hours	Individual work	Total hours/ ECTS
6	Didactical-physical lab 1				45		45	75	120/4
7	Review of modern physics	60		30			90	210	300/10
8	Physics of Biological Systems	45		15			60	180	240/8
9	Pedagogical practice for didactics of physics 1	30				16	46	194	240/8
	Cummulative	135	0	45	45	16	241	659	900/30

2nd year, 3rd semester

Course number	Course title	L /EL	S	T	LW	FW	Total contact hours	Individual work	Total hours/ ECTS
10	Didactics of Physics 2	60	15	30			105	135	240/8
11	Didactical-physical lab 2				45		45	75	120/4
12	Seminar in Modern Physics		20				20	100	120/4
13	Environmental Physics *	45				30	75	165	240/8
14	Pedagogy **	30	15				45	75	120/4
15	Didactics **	30	15				45	75	120/4
	Elective Courses*** (18+19)	60			30		90	90	180/6
	Cummulative*	165	35	30	75	30	335	565	900/30

** for students who have graduated from the undergraduate study programme Educational Physics and for students who have taken the courses in Pedagogy and Didactics (denoted by **) at the former undergraduate study programme*

*** for students who have not graduated from the undergraduate study programme Educational Physics and for students who have not taken the courses in Pedagogy and Didactics at the former undergraduate study programme*

***See the Table of Elective Courses

2nd year, 4th semester

Course number	Course title	L /EL	S	T	LW	IMW	Total contact hours	Individual work	Total hours/ ECTS
16	Master thesis					15	15	465	300/16
17	Pedagogical practice for didactics of physics 2	30				16	46	194	240/8
	Elective Courses*** (21+24)	60	15		15		90	90	180/6
	Cummulative	90	15		15	31	151	749	900/30

***See the Table of Elective Courses

Students can choose elective courses fom the list of pedagogical elective courses (cumulatively 6 ECTS in 3th semester and cumulatively 6 ECTS in 4th semester).

Pedagogical Elective Courses

Elective Courses of the 2nd year

Course number	Course title	L /EL	S	T	LW	FW	Total contact hours	Individual work	Total hours/ ECTS
18	E-teaching in physics education	30			15		45	45	90/3
19	Applicative physics in education	30			15		45	45	90/3
20	Reflective Teaching	30		15			45	45	90/3
21	Conceptual learning of Physics	30			15		45	45	90/3
22	Communication in education	15	15	15			45	45	90/3
23	Psychology of development and learning**	45	15	15			75	105	180/6
24	Philosophy of Science	30	15				45	45	90/3
25	Selected topics in school discipline	30	15				45	45	90/3
26	Cognition and personality in the learning process	30		15			45	45	90/3

** *for students who have not graduated from the undergraduate study programme Educational Physics and for students who have not taken the course in* Psychology of development and learning *at the former undergraduate study programme*

CONCLUDING OF THE PROGRAMME

The study programme is sucessfully concluded when all the courses and obligations defined in the programme are passed and a total of minimum 120 ECTS is achieved.

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 ob the faculty web page and on the notice boards. There are at least 6 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.

The master thesis is presented publicly infront of an examination board composed of the Head of the Chair, the master thesis tutor and co-tutor and another member of the board.

ECTS DEPARTMENTAL CO-ORDINATOR

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

Single major pedagogical Master study programme Educational Physics

Code	Course title	Type	ECTS
1	Didactics of Physics 1	O	6
2	Didactics of Astronomy	O	5
3	Selected topics from Physics	O	8
4	Projects in Physics Education and Tutorial Work	O	7
5	Working with children with special needs	O	4
6	Didactical-physical lab 1	O	4
7	Review of modern physics	O	10
8	Physics of Biological Systems	O	8
9	Pedagogical practice for didactics of physics 1	O	8
10	Didactics of Physics 2	O	8
11	Didactical-physical lab 2	O	4
12	Seminar in Modern Physics	O	4
13	Environmental Physics *	O	8
14	Pedagogy **	O	4
15	Didactics **	O	4
16	Master thesis	O	16
17	Pedagogical practice for didactics of physics 2	O	8
18	E-teaching in physics education	E	3
19	Applicative physics in education	E	3
20	Reflective Teaching	E	3
21	Conceptual learning of Physics	E	3
22	Communication in education	E	3
23	Psychology of development and learning**	E	6
24	Philosophy of Science	E	3

O … obligatory course E … elective course

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***** for students who have not graduated from the undergraduate study programme Educational Physics and for students who have not taken the courses in Pedagogy and Didactics at the former undergraduate study programme***