

University of Maribor
Faculty of Natural Sciences and Mathematics

Information on the two-field degree programme
Educational Physics

General description

QUALIFICATION AWARDED

Qualification awarded: University degree in two fields: Educational Physics (as the other field students can choose: Biology, Chemistry, Mathematics, Computing, Engineering with Technology)

Duration of studies: 3 years

ADMISSION REQUIREMENTS

- a) a successfully completed Matura examination or
- b) professional Matura with the fifth subject (which should differ from the professional Matura subjects) or
- c) successfully finished secondary school before June 1, 1995.

In case of enrolment limitations, applicants under a) and c) are admitted according to their GPA on the Matura examination or final exam (60% of the points) and their overall GPA in the third and the fourth year of secondary school (40% of the points).

The applicants under b) are admitted according to their GPA at the professional Matura (20% of the points), their overall GPA in the third and the fourth year of secondary school (20% of the points), their GPA in Mathematics in the third and the fourth year of the secondary school (40% of points) and the GPA at the fifth subject (20% of points).

EDUCATIONAL AND PROFESSIONAL GOALS

The main goal is that the graduate achieves the basic and profound knowledge from two study fields, which are important for the professional and educational surroundings. The fundamental goal is that, in addition to fundamental physical knowledge, graduates also achieve the knowledge from the analysis and structure of dynamical systems and the understanding of complex systems in life and technology. An important goal is also development of logical thinking, recognition of the problems and the approach to their solution. Graduates are also able to perform work with the help of modern elements of educational technology, communicational, informational and computer systems. Graduates also achieve basic knowledge from the pedagogy, psychology and didactics, the knowledge which is essential in education.

Elective courses enable the student to achieve specific knowledge in accordance with his or her future study or work plans. The degree enables enrolment into different master study programmes or employment in educational and other professional jobs where bachelor degree is required.

The main general competences achieved by the graduates at both levels are:

- ability of analytical thinking and understanding of complex systems, which enables the graduates to integrate into interdisciplinary groups,
- ability for communication and team work,
- basic knowledge from the study field, general pedagogical field and field of communication, as well as knowledge on the related fields,

- critical judgement on the ongoing in the professional and educational field,
- solution of the professional and work problems by sources search and the use of professional applicative and scientific methods,
- computer and informational literacy,
- laboratory expertise,
- use and development of the traditional educational systems, presentational, media and information-communicational technology in the professional and educational field,
- autonomy in the professional work,
- understanding of the individual worth and worth systems, mastering of professional-ethical questions,
- knowledge and understanding of the institutional work-frames (legislation, documentation, legal aspects of professional and educational work...).

The main specific competences achieved by the graduates at both levels are:

- development of science thinking, knowledge of the fundamental facts and laws of nature,
- knowledge and understanding of fundamental physical concepts and their use in explanations of natural phenomena and processes in the environment,
- knowledge of connection between physical systems and other systems in nature and society,
- knowledge and understanding of the influence physics has on the development of engineering and technology,
- knowledge and ability to solve basic professional (physical, media, informational-communicational) and educational problems on the qualitative and quantitative level,
- use the science thinking approach for quantitative description of problems in nature, environment and society,
- connection of the microscopic and macroscopic explanation of phenomena,
- basic understanding of the environmental issues and the importance of physics in reduction of pollution,
- theoretical and experimental skills for solving problems,
- mastering of basic and elaborate measurements methods from the professional and educational field,
- use of informational-communicational technology with theoretical and experimental work,
- organization of the project-, group- and lab-work,
- ability for safe experimental and lab work, ability to identify work risks, knowledge of safety regulations and their execution,
- knowledge of skills needed for the field work,
- theoretical and practical knowledge for affective integration of ICT into the professional and educational field,
- knowledge of maintenance and management procedures with audio-visual and media technology,
- knowledge of maintenance and management procedures with ICT,
- ability to organize and run interest activities from the field of science, engineering and computing,
- knowledge of the procedures how to establish, maintain and run the systems for e-learning in small, medium and large systems (companies, educational institutions...),
- knowledge of the procedures how to establish, maintain and run the systems for distant learning in small, medium and large systems (companies, educational institutions...),

ACCESS TO FURTHER STUDIES

Graduates of the undergraduate two-field university programme Educational Physics can continue their studies at the graduate level leading to the M. Sc. degree. The most natural continuation is at the master pedagogical the two-field study program, which gives the competencies to teach in elementary and some secondary schools. Graduates can also enrol into any study program related to one of the two fields studied at the undergraduate level.

COURSE STRUCTURE DIGRAM WITH CREDITS

Complete curricula of the two-field undergraduate university programme Educational Physics is given below. 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

Two-field undergraduate university 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	Physics I	/45		30	15		90	150	240/8
2	Computer in Physics	30			15		45	75	120/4
3	Mathematics (if the other field is not Mathematics) (1/2 of 6 ECTS)	22.5		15			37.5	52.5	90/3
4	Fundamentals of Computer Science (if the other field is Mathematics) (1/2 of 6 ECTS)	15			22.5				
	SUM (if the other field is not Mathematics)	97.5		45	30		172.5	277.5	450/15

1st year, 2nd semester

Course number	Course title	L /EL	S	T	LW	FW	Total contact hours	Individual work	Total hours/ECTS
5	Physics II	75		45			120	120	240/8
6	Physics Experiments I				40		40	80	120/4
7	Chemistry (if the other field is not Chemistry) (1/2 of 6 ECTS)	22.5			15		37.5	52.5	90/3
8	Modern Biology (if the other field is Chemistry) (1/2 of 6 ECTS)	15	15						
	SUM (if the other field is not Chemistry)	97.5		45	55		197.5	252.5	450/15

2nd year, 3rd semester

Course number	Course title	L /EL	S	T	LW	FW	Total contact hours	Individual work	Total hours/ ECTS
9	Physics III	45		30			75	165	240/8
10	Physics Experiments II				40		40	80	120/4
11	Psychology of development and learning (1/2 of 6 ECTS)	22.5	7.5	7.5			37.5	52.5	90/3
	SUM	67.5	7.5	37.5	40		152.5	297.5	450/15

2nd year, 4th semester

Course number	Course title	L /EL	S	T	LW	FW	Total contact hours	Individual work	Total hours/ ECTS
12	Physics IV	60		30			90	120	210/7
13	Educational technology	15			30		45	45	90/3
14	Inform. Communic. Tech. (1/2 of 4 ECTS)	15			15		30	30	60/2
	Elective Course 1	22.5		15			37.5	52.5	90/3
	SUM	120		45	45		202.5	247.5	450/15

3rd year, 5th semester

Course number	Course title	L /EL	S	T	LW	FW	Total contact hours	Individual work	Total hours/ ECTS
15	Physics of Complex Systems	30		15			45	105	150/5
16	Physics Experiments III				40		40	110	150/5
17	Didactics (1/2 of 4 ECTS)	15	7.5				22.5	37.5	60/2
	Elective Course 2	22.5		15	0		37.5	52.5	90/3
	SUM	67.5	7.5	30	40		145	305	450/15

3rd year, 6th semester

Course number	Course title	L /EL	S	T	LW	FW	Total contact hours	Individual work	Total hours/ ECTS
18	Electronics in Physics	30	15		15		60	60	120/4
19	Seminar in Physics	5	15				20	160	180/6
20	Pedagogy (1/2 of 4 ECTS)	15	7.5		0		22.5	37.5	60/2
	Elective Course 3	22.5		15			37.5	52.5	90/3
	SUM	72.5	37.5	15	15		140	310	450/15

Elective courses 1, 2, 3: Students can chose from the courses below. They can also chose one course freely (not limited to the list below).

Course number	Course title	L /EL	S	T	LW	FW	Total contact hours	Individual work	Total hours/ ECTS
21	Environmental Physics	45				30	75	105	180/6
22	Physics of Biological Systems	30	15	30			75	105	180/6
23	Econophysics	60		15			75	105	180/6
24	Multimedia in Physics	45			30		75	105	180/6
25	Astronomical observations	15		15	30	15	75	105	180/6
4	Fundamentals of Computer Science (if the other field is Chem or Bio or Teh)	45			30		75	105	180/6
8	Modern Biology (if the other field is Mat or Comp or Teh)	30	30				60	120	180/6
26	Basic concepts of design and technology (if the other field is Mat or Comp or Bio or Chem)	30	15		30		75	105	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 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.

ECTS DEPARTMENTAL CO-ORDINATOR

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

Information on the two-field degree programme *Educational Physics*

List of Courses

Two-field undergraduate university programme Educational Physics and ...

Code	Course title	Type	ECTS
	Astronomical observations	E	6
	Basic concepts of design and technology	E	6
	Chemistry	O	6
	Computer in Physics	O	4
	Didactics	O	4
	Econophysics	E	6
	Educational technology	O	3
	Electronics in Physics	O	4
	Environmental Physics	E	6
	Fundamentals of Computer Science	E,O	6
	Informational Communicational Technology	O	4
	Mathematics	O	6
	Modern Biology	E,O	6
	Multimedia in Physics	E	6
	Pedagogy	O	4
	Physics Experiments I	O	4
	Physics Experiments II	O	4
	Physics Experiments III	O	5
	Physics I	O	8
	Physics II	O	8
	Physics III	O	8
	Physics IV	O	7
	Physics of Biological Systems	E	6
	Physics of Complex Systems	O	5
	Psychology of development and learning	O	6
	Seminar in Physics	O	6

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