

# **UNDERGRADUATE STUDY PROGRAMME PHYSICS**

**(valid from ac. year 2022./2023.)**

(Amendments and supplements to the program implemented in 2024 do not affect the curriculum - the list of mandatory and elective courses and/or modules with the number of hours of active teaching required for their completion and the number of ECTS credits remains unchanged, i.e. it is the same as the program adopted at the Senate session in June 2022.)

**UNDERGRADUATE STUDY PHYSICS**  
(valid from ac. year 2022./2023.)

LIST OF COURSES							
Semester: 1.							
MODULE	COURSE		L	P	S	ECTS	STATUS <sup>1</sup>
All modules	Physics I: Mechanics		45	45	0	8	C
	Analysis I		45	45	0	8	C
	Linear Algebra I		45	45	0	8	C
	Programming		30	30	0	5	C
	Elective courses					3	E
Elective courses							
The student enrolls in (at least) one course with a total of 3 ECTS credits.							
All modules	Fundamentals of Computer Science		15	15	0	3	E
	Basic Mathematics		15	15	0	3	E
	Nontraditional Physics Problems		15	0	15	3	E
	English for Specific Purposes		15	15	0	3	E
	Gymnastics and health culture		0	30	0	1	E

LIST OF COURSES							
Semester: 2.							
MODULE	COURSE		L	P	S	ECTS	STATUS
All modules	Physics II: Electricity and Magnetism		45	45	0	8	C
	Data Analysis		30	30	0	4	C
	Analysis II		45	45	0	8	C
	Linear Algebra II		45	45	0	8	C

<sup>1</sup> Enter C if the subject is compulsory or E if the subject is elective..

LIST OF COURSES							
Semester: 3.							
MODULE	COURSE		L	P	S	ECTS	STATUS
All modules	Physics III: Waves and Optics		45	30	0	7	C
	Physics Laboratory I		0	0	45	3	C
	Modern Physics I		60	15	15	6	C
Physics	<b>Elective group FIZ-III</b> <i>(all courses in the group have to be enrolled):</i>						
	Mathematical Methods of Physics I		30	30	0	5	E
	Classical Mechanics I		45	45	15	9	E
Environmental science	<b>Elective group OKO-III</b> <i>(all courses in the group have to be enrolled):</i>						
	Mathematical Methods of Physics I		30	30	0	5	E
	Classical Mechanics I		45	45	15	9	E
Mathematics	<b>Elective group MAT-III</b> <i>(all courses in the group have to be enrolled):</i>						
	Classical Mechanics		45	45	0	7	E
	Analysis III		45	45	0	7	E
Computer Science	<b>Elective group INF-IV</b> <i>(all courses in the group have to be enrolled):</i>						
	Classical Mechanics		45	45	0	7	E
	Mathematical Methods of Physics I		30	30	0	5	E
	Object-Oriented Programming		30	30	0	5	E
Philosophy	<b>Elective group FIL-III</b> <i>(all courses in the group have to be enrolled):</i>						
	Classical Mechanics		45	45	0	7	E
	Mathematical Methods of Physics I		30	30	0	5	E
	Introduction into Philosophy		30	0	30	6	E

LIST OF COURSES							
Semester: 4.							
MODULE	COURSE		L	P	S	ECTS	STATUS
All modules	Physics IV: Thermodynamics and Basic Statistical Physics		60	30	0	8	C
	Physics Laboratory II		0	0	45	3	C
	Modern Physics II		60	15	15	6	C
Physics	<b>Elective group FIZ-IV</b> <i>(all courses in the group have to be enrolled):</i>						
	Mathematical Methods of Physics II		30	30	0	5	E
	Classical Mechanics II		45	30	15	8	E
Environmental science	<b>Elective group OKO-IV</b> <i>(all courses in the group have to be enrolled):</i>						
	Mathematical Methods of Physics II		30	30	0	5	E
	Chemistry I		30	10	30	8	E
Mathematics	<b>Elective group MAT-IV</b> <i>(all courses in the group have to be enrolled):</i>						
	Differential Equations		30	30	0	6	E
	Complex Analysis		45	30	0	7	E
Computer Science	<b>Elective group INF-IV</b> <i>(all courses in the group have to be enrolled):</i>						
	Mathematical Methods of Physics II		30	30	0	5	E
	Data Modeling		30	30	0	5	E
	Algorithms and Data Structures		30	30	0	5	E
Philosophy	<b>Elective group FIL-IV</b> <i>(all courses in the group have to be enrolled):</i>						
	Mathematical Methods of Physics II		30	30	0	5	E
	Ancient philosophy		30	30	0	6	E

LIST OF COURSES							
Semester: 5.							
MODULE	COURSE		L	P	S	ECTS	STATUS
All modules	Physics Laboratory III		0	0	45	3	C
	Electrodynamics		45	45	15	12	C

Physics	Elective group FIZ – V						
	Elective courses totaling (at least) 15 ECTS credits are to be enrolled, with at least one of the courses being from physics. In agreement with the program coordinator and the ECTS coordinator, it is possible to: <ul style="list-style-type: none"> <li>- enroll in courses from modules of the undergraduate Physics program;</li> <li>- enroll in a free elective course at the University of Rijeka;</li> <li>- possibility to enroll in an elective course from the summer or winter semester.</li> </ul>						
	Measurements in Physics		30	15	15	5	E
	Computational Physics		30	15	15	5	E
	General Chemistry		30	0	15	5	E
	Physical Chemistry		30	30	0	6	E
Mathematical models in natural sciences and humanities		30	15	15	5	E	

Environmental science	Elective group OKO-V						
	Chemistry II		30	0	30	7	E
	In addition to Chemistry II, elective courses totaling (at least) 5 ECTS credits are enrolled. Courses marked with (*) are recommended for enrollment in the graduate Physics program, Physics and Environmental Science track.						
	Measurements in Physics		30	15	15	5	E
	Computational Physics		30	15	15	5	E
	Mathematical models in natural sciences and humanities		30	15	15	5	E
	Physical Chemistry *		30	30	0	6	E
	Physical geology*		30	10	0	3	E
General Ecology *		15	15	15	3	E	

Mathematics	<b>Elective group MAT-V</b> <i>(all courses in the group have to be enrolled):</i>						
	Combinatorics		30	30	0	5	E
	Euclidean Spaces		30	30	0	5	E
	Mathematical Logic		30	30	0	5	E

Computer Science	<b>Izborna grupa INF-V</b> <i>(the Database course is enrolled along with an elective course according to the specified condition):</i>						
	Databases		30	30	0	5	E
	Elective course: In addition to the Databases course, students enroll in an elective course in the 5th or 6th semester for at least as many ECTS credits as required to complete their studies. Elective courses are chosen from the elective groups of the 5th and 6th semester of the physics module.						

Philosophy	<b>Elective group FIL-V</b> <i>(all courses in the group have to be enrolled):</i>						
	Logic		30	0	30	6	E
	Philosophy as a System. History of the Classical German Idealism.		30	0	30	6	E
	Epistemology		30	0	30	6	E

LIST OF COURSES							
Semester: 6.							
MODULE	COURSE	L	P	S	ECTS	STATUS	
All modules	Undergraduate Thesis				5	C	
	Physics Laboratory IV	0	0	60	6	C	
	Quantum Mechanics	45	45	15	12	C	
Physics	<b>Elective group FIZ-VI</b>						
	Methodology of Elaborating Professional and Scientific Papers	20	0	40	4	E	
	<i>In addition to Methodology, at least one more elective course worth 3 ECTS must be enrolled:</i>						
	Laboratory Project	0	0	30	3	E	
	Symbolic Programming	15	15	0	3	E	
	Introduction to astronomy and astrophysics	30	0	15	4	E	
	Physics Seminars	0	0	30	3	E	
Environmental Physics	20	10	10	6	E		
Environmental science	<b>Elective group OKO-V</b> <i>(all courses in the group have to be enrolled):</i>						
	Methodology of Elaborating Professional and Scientific Papers	20	0	40	4	E	
	Environmental Physics	20	10	10	6	E	
Mathematics	<b>Elective group MAT-V</b> <i>(all courses in the group have to be enrolled):</i>						
	Methodology of Elaborating Professional and Scientific Papers	15	0	15	1	E	
	Introduction to Probability and Mathematical Statistics	30	45	0	6	E	
Computer Science	<b>Elective group INF-V</b> <i>(all courses in the group have to be enrolled):</i>						
	Methodology of Elaborating Professional and Scientific Papers	15	0	15	1	E	
	Introduction to Web Programming	30	30	0	5	E	
	Introduction to Software Engineering	30	30	0	5	E	

		Elective group FIL-V					
Philosophy	Methodology of Elaborating Professional and Scientific Papers		15	0	15	1	E
	<i>In addition to Methodology, at least one more elective course with 3 ECTS must be enrolled. To enroll in the master's program Physics and Philosophy, it is also necessary to enroll in and pass philosophy courses marked with *:</i>						
	Modern Philosophy from Descartes to Kant *		30	0	30	6	E
	Metaphysics *		30	0	30	6	E
	Ethics *		60	0	0	6	E
	Laboratory Project		0	0	30	3	E
	Symbolic Programming		15	15	0	3	E
	Introduction to astronomy and astrophysics		30	0	15	4	E
	Physics Seminars		0	0	30	3	E
	Environmental Physics		20	10	10	6	E

<sup>1</sup> Enter C if the subject is compulsory or E if the subject is elective..