

GRADUATE 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.)

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

LIST OF COURSES							
Semester: 1.							
MODULE	COURSE		L	P	S	ECTS	STATUS ¹
All modules	Statistical Mechanics		45	15	15	8	C
SSP	Advanced Electrodynamics	all courses in the group have to be enrolled	45	15	15	8	E
	Advanced Quantum Physics		45	30	15	8	E
	Physics of Materials		30	30	0	6	E
AEPP	Advanced Electrodynamics	all courses in the group have to be enrolled	45	15	15	8	E
	Advanced Quantum Physics		45	30	15	8	E
	General Relativity		30	15	15	6	E
PES	Atmospheric Physics	all courses in the group have to be enrolled	30	15	15	7	E
	Atmospheric Chemistry		30	10	30	7	E
	Instrumental Methods in Environmental Physics		30	30	0	7	E
AMoF	Advanced Electrodynamics	all courses in the group have to be enrolled	45	15	15	8	E
	Advanced Quantum Physics		45	30	15	8	E
	Quantum theory of Atoms and Molecules		30	15	15	6	E

MODULES:

Solid State Physics – **SSP**

Astrophysics and Elementary Particle Physics - **AEPP**

Physics and Environmental Science - **PES**

Atomic and Molecular Physics - **AMoF**

¹ Enter C if the subject is compulsory or E if the subject is elective..

LIST OF COURSES							
Semester: 2.							
MODULE	COURSE		L	P	S	ECTS	STATUS
All modules	Seminar in Physics on English		0	0	15	2	E
SSP	Solid State Physics I	all courses in the group have to be enrolled	45	30	15	8	E
	Atomic and Molecular Physics		45	15	15	8	E
	Experimental Methods in Physics I		30	15	15	6	E
	Elective courses:	one course of 6 ECTS credits has to be enrolled (*)					
	Electronics		30	15	15	6	E
	Quantum Field Theory		30	15	15	6	E
	Advanced Computational Physics		30	15	15	6	E
AEPP	16 ECTS credits have to be enrolled (*). At least one of the courses: "Astronomy and Astrophysics I", "Elementary Particle Physics I" must be enrolled.						
	Astronomy and Astrophysics I		45	30	15	8	E
	Atomic and Molecular Physics		45	15	15	8	E
	Elementary Particle Physics I		45	30	15	8	E
	Nuclear Physics		30	15	15	6	E
	Experimental Methods in Physics I		30	15	15	6	E
	Electronics		30	15	15	6	E
	Quantum Field Theory		30	15	15	6	E
	Advanced Computational Physics		30	15	15	6	E
PES	Experimental Methods in Physics I	all courses in the group have to be enrolled	30	15	15	6	E
	Soil Physics		30	15	15	7	E
	Elective courses:	16 ECTS credits have to be enrolled (*) (**)					
	Atomic and Molecular Physics		45	15	15	8	E
	Nuclear Physics		30	15	15	6	E
	Terrestrial Ecology		30	30	0	6	E
	Advanced Experimental Laboratory		0	0	60	6	E
	Advanced Computational Physics		30	15	15	6	E
	Spatial planning		40	10	10	5	E
	Waste Management		30	10	5	4	E
	Water management		30	0	30	4	E
	Waste management		20	0	10	3	E
	Biological oceanography		15	15	0	3	E
	Environmental impact assessment		20	0	10	3	E
	Green Synthesis of nanomaterials		20	0	10	3	E
Ecotoxicology	20	0	10	3	E		

	Management of Commons ***		30	0	30	6	E
	Extreme Natural and Social Events ***		30	0	30	6	E
AMoF	Atomic and Molecular Physics	all courses in the group have to be enrolled	45	15	15	8	E
	Experimental Methods in Physics I		30	15	15	6	E
	Elective courses:					14	E
	Electronics	one course of 6 ECTS credits has to be enrolled (*)	30	15	15	6	E
	Solid State Physics I		45	30	15	8	E
	Advanced Computational Physics		30	15	15	6	E
	Nuclear Physics		30	15	15	6	E

LIST OF COURSES							
Semester: 3.							
MODULE	COURSE		L	P	S	ECTS	STATUS
SSP	Solid State Physics II	all courses in the group have to be enrolled	30	15	15	6	E
	Semiconductors: principles and applications		30	15	15	6	E
	Experimental Methods in Physics II		30	15	15	6	E
	Structure of Matter Lab		0	0	60	6	E
	Elective courses:	one course of 6 ECTS credits has to be enrolled (*)					
	Magnetic Materials and Applications		30	15	15	6	E
	Selected topics of Atomic and Molecular Spectroscopy		30	15	15	6	E
	Electronics laboratory		0	0	60	6	E
	Precision Engineering and Micro System Technology		45	30	0	6	E
AEPP	Astronomy and Astrophysics II	30 ECTS credits have to be enrolled (*)	30	15	15	6	E
	Astroparticle Physics		30	15	15	6	E
	Experimental Methods in Physics II		30	15	15	6	E
	Elementary Particle Physics II		30	15	15	6	E
	Structure of Matter Lab		0	0	60	6	E
	Electronics laboratory		0	0	60	6	E
	Observational Astrophysics		30	15	15	6	E
PES	Experimental Methods in Physics II	all courses in the group have to be enrolled	30	15	15	6	E
	Structure of Matter Lab		0	0	60	6	E
	Physical oceanography		30	30	0	7	E
	Elective courses:	11 ECTS credits have to be enrolled (*)				11	E
	Interaction of the atmosphere and the sea and influence on oceanographic properties		30	0	30	6	I
	Environmental Microbiology		30	20	10	6	I
	Selected topics of Atomic and Molecular Spectroscopy		30	15	15	6	I
	Aquatic Ecology		15	15	15	5	I
	Geohazards		20	10	15	3	I
	Environmental protection		15	0	15	2	I
	Physical Chemistry		30	30	0	6	I
	Hydrogeology		30	15	0	5	I
	Physical modeling of the environment		30	30	0	6	I
	Green Synthesis of nanomaterials		20	0	10	3	I
	Ecotoxicology		20	0	10	3	I
Data analysis in Natural and Social sciences (***)	30	45	15	9	I		

AMoF	Experimental Methods in Physics II	all courses in the group have to be enrolled	30	15	15	6	E
	Structure of Matter Lab		0	0	60	6	E
	Selected topics of Atomic and Molecular Spectroscopy		30	15	15	6	E
	Elective courses:	two courses of 12 ECTS credits have to be enrolled (*)					
	Solid State Physics II		30	15	15	6	E
	Physical Chemistry		30	30	0	6	E
	Semiconductors: principles and applications		30	15	15	6	E
	Electronics laboratory		0	0	60	6	E
	Precision Engineering and Micro System Technology	45	30	0	6	E	

LIST OF COURSES							
Semester: 4.							
MODULE	COURSE		L	P	S	ECTS	STATUS
All modules	Master Thesis Seminar		0	0	15	6	C
	Master Thesis		0	180	0	18	C
SSP	Quantum Field Theory	one course of 6 ECTS credits has to be enrolled (*)	30	15	15	6	E
	Advanced Computational Physics		30	15	15	6	E
	Advanced Experimental Laboratory		0	0	60	6	E
	Spintronics		30	15	15	6	E
	Practical Work		0	0	150	6	E
AEPP	Astrophysics Lab	one course of 6 ECTS credits has to be enrolled (*)	0	0	60	6	E
	Physical Cosmology		30	15	15	6	E
	Advanced Computational Physics		30	15	15	6	E
	Selected Topics in High Energy Physics		30	15	15	6	E
	Practical Work		0	0	150	6	E
PES	Atomic and Molecular Physics	one course of 6 ECTS credits has to be enrolled (*), (**)	45	15	15	8	E
	Nuclear Physics		30	15	15	6	E
	Terrestrial Ecology		30	30	0	6	E
	Advanced Experimental Laboratory		0	0	60	6	E
	Advanced Computational Physics		30	15	15	6	E
	Spatial planning		40	10	10	5	E
	Waste Management		30	10	5	4	E
	Water management		30	0	30	4	E
	Waste management		20	0	10	3	E
	Practical Work		0	0	150	6	E
	Biological oceanography		15	15	0	3	E
	Environmental impact assessment		20	0	10	3	E
	Green Synthesis of nanomaterials		20	0	10	3	E
	Ecotoxicology		20	0	10	3	E
	Management of Commons ***		30	0	30	6	E
Extreme Natural and Social Events ***	30	0	30	6	E		
AMoF	Quantum Field Theory	one course of 6 ECTS credits has to be enrolled (*)	30	15	15	6	E
	Advanced Computational Physics		30	15	15	6	E
	Advanced Experimental Laboratory		0	0	60	6	E
	Nuclear Physics		30	15	15	6	E
	Practical Work		0	0	150	6	E

(*) In order to increase the flexibility of the study, with the consent of module coordinator and ECTS coordinator, it is possible to enroll in elective courses from other modules of the graduate study program in Physics, as well as from other study programs offered at the University of Rijeka's constituent units.

(**) PES: In the second semester, students must enroll in 16 ECTS credits, and in the fourth semester, 6 ECTS credits. Out of a total of 22 elective ECTS credits in the 2nd and 4th semesters, students must enroll in at least one physics course.

(***) Micro-qualification:

Management of Commons

Extreme Natural and Social Events

Data analysis in Natural and Social sciences