



<http://fizika.pmfst.hr/astro>

Type of program	Graduate
Program title	Physics, Orientation (Major): astrophysics
Duration	2 years
ECTS points	120 in total
Admission requirements	Completed Undergraduate study program in Physics, or some similar study program. Students who do not have all the necessary competences are required to attend the prerequisite courses.
Learning outcomes and competences	<p>Students acquire:</p> <ul style="list-style-type: none"> • modeling skills • problem solving skills by applying acquired knowledge • ability to absorb new knowledge • skills of efficient adjustment to new problems and situations. <p>These competences, together with a deep understanding of physics, enable students to continue postgraduate studies of physics, participate in scientific projects and work in occupations that require both basic and applied knowledge of physics.</p> <p>Acquired competences within the astrophysics major enable:</p> <ul style="list-style-type: none"> - work in astronomical observatories - work in institutes and institutions on astronomical or astrophysical research - work in occupations that demand wide knowledge of natural sciences, especially young interdisciplinary scientific disciplines.
Access to further studies	Students can continue education at postgraduate studies in physics or in similar study programs.
Qualification awarded	Master of Science in Physics, orientation astrophysics

1.Semester (30 ECTS)

Required courses:

Course title	Course structure* L+S+E+P	ECTS points	Lecturers
Quantum physics II	30+0+15+0	5	
Modern astrophysics I	30+0+30+0	5	M.Elitzur M.Čemeljić
Methods of observational astronomy I	10+0+20+0	3	A.Seifahrt A.Bedalov
Research	0+20+0+0	5	
Elective courses		12	

* Hours: L=Lectures, S=Seminars, E= exercises, P=Practical (Laboratory)

Elective Courses:

Course title	Course structure* L+S+E+P	ECTS points	Lecturers
History of astronomy	30+15+0+0	3	G. Wuchterl
Optics	0+15+0+30	4	B. Balick C. Claver
Astrobiology	30+15+0+0	4	K. Hand T. Bosak
Extra-solar planets	30+15+0+0	4	G. Wuchterl M. Kürster
Hydrodynamics in astrophysics	30+0+15+0	4	G. Wuchterl P. Mimica
Solid state physics	30+0+15+0	4	
Experimental methods of modern physics	30+0+15+0	4	
Basics of relativistic physics	30+0+0+0	3	
Chaos and fractals	30+0+0+0	3	
Dynamics of atoms in gas and liquid phase	30+0+15+15	5	
Electronic basics I	30+0+15+0	4	
Object oriented programming	30+0+30+0	5	
Bioinformatics	20+10+0+10	5	
Introduction to meteorology	30+0+10+0	4	
Psychology of self-confidence and positive thinking	15+15+0+0	2	
Rhetoric	15+15+0+0	2	
Logic	15+15+0+0	2	
German language I	0+30+0+0	2	

* Hours: L=Lectures, S=Seminars, E= exercises, P=Practical (Laboratory)

2.Semester (30 ECTS)

Required courses:

Course title	Course structure* L+S+E+P	ECTS points	Lecturers
Modern astrophysics II	30+0+30+0	5	Ž. Ivezić S. Bertone
Methods of observational astronomy II	10+0+20+0	3	S. Gezari
Research	0+20+0+0	5	
Elective courses		17	

* Hours: L=Lectures, S=Seminars, E= exercises, P=Practical (Laboratory)

Elective Courses:

Course title	Course structure* L+S+E+P	ECTS points	Lecturers
Physics of disordered matter	30+0+15+0	4	
Biophysics	30+0+15+0	5	
Environmental science	30+0+10+0	4	
Celestial mechanics and dynamical systems	30+0+15+0	4	M. Jurić B. Pečnik
Interstellar matter	30+0+15+0	3	D. Chelouche D. Vinković
Nuclear physics	30+0+15+0	4	
Electronic basics II	30+0+15+0	4	
History of modern physics	30+0+0+0	3	
Research methods in natural sciences	15+0+0+15	3	
Life and physical environment	15+0+0+0	2	
Ecosystem ecology	15+0+0+0	2	
Atomic and molecular quantum mechanics	20+15+15+0	5	
Mathematical methods in signal processing	30+0+30+0	5	
Computer graphics	30+0+30+0	5	
Partial differential equations	30+0+30+0	6	
Philosophy of science	15+15+0+0	2	
Sociology of science	15+15+0+0	2	
Language culture	15+15+0+0	2	
Media in education	15+15+0+0	2	
Psychology of self motivation	15+15+0+0	2	
German language II	0+30+0+0	2	

* Hours: L=Lectures, S=Seminars, E= exercises, P=Practical (Laboratory)

3.Semester (30 ECTS)

Required courses:

Course title	Course structure* L+S+E+P	ECTS points	Lecturers
Modern astrophysics III	30+0+30+0	5	D. Krajnović T. Prokopec
Science communication	20+10+0	2	M. Elizur D. Bonacci
Research	0+30+0+0	10	
Elective courses		13	

* Hours: L=Lectures, S=Seminars, E= exercises, P=Practical (Laboratory)

Elective courses:

Course title	Course structure* L+S+E+P	ECTS points	Lecturers
History of astronomy	30+15+0+0	3	G. Wuchterl
Solid state physics	30+15+0+0	4	
Optics	0+15+0+30	4	B. Balick C. Claver
Astrobiology	30+15+0+0	4	K. Hand T. Bosak
Extra-solar planets	30+15+0+0	4	G. Wuchterl M. Kürster
Hydrodynamics in astrophysics	30+0+15+0	4	G. Wuchterl P. Mimica
Elementary particles	30+0+15+0	4	
Numerical methods in high energy physics	20+20+30+0	8	
Basics of relativistic physics	30+0+0+0	3	
Chaos and fractals	30+0+0+0	3	
Introduction to superconductivity	30+0+0+0	3	
Environmental microbiology	30+0+30+0	5	
Dynamics of atoms in gas and liquid phase	30+0+15+15	5	
Object oriented programming	30+0+30+0	5	
Psychology of self-confidence and positive thinking	15+15+0+0	2	
Rhetoric	15+15+0+0	2	
Logic	15+15+0+0	2	

4. Semester (30 ECTS)

Course title	Course structure* L+S+E+P	ECTS points	Lecturers
Diploma thesis	0+10+0+0	30	