SOFIA UNIVERSITY ST. KLIMENT OHRIDSKI

FACULTY: Physics

C U R R I C U L U M

Approved by:	Approved by the Academic Council with Record of Proceedings № ..... / .....

Professional Field: 4.1 Physics

Educational and Qualification Degree: "Master"

Area of Study: "Astrophysics, meteorology and geophysics"

P	H	A	3	0	2	1	2	4

/Master's Degree Program: "Astronomy and Astrophysics"

Form of Study: full time
Length of Study (number of weeks*/-): 45 weeks (3 semesters)

Professional Qualification: "Master of Science in Astrophysics, meteorology and geophysics" – Astronomy and Astrophysics

Qualification Description

Master's Degree Program: Astronomy and Astrophysics

1. Aims and Educational Objectives

The Master's program in "Astronomy and Astrophysics" in the specialty "Astrophysics, meteorology and geophysics" has a specialized character. The program aims to provide in-depth knowledge and to help students to develop practical skills in the main fields of modern astronomy and astrophysics.

2. Admission of students (knowledge and skills required for a successful professional realization; general and theoretical background, specific areas of study, etc.)

The program is intended for the training of persons who hold: i) a "Bachelor's" or "Master's" educational-qualification degree in the fields of higher education "Physical sciences", "Technical sciences" or "Pedagogy of training in: natural sciences, mathematics and informatics" from Bulgarian universities; or, ii) a "Bachelor of Science" or "Master of Science" degree from universities in other countries worldwide.

Admission of students is done through a test and on the basis of educational documents: degree certificate(s) and an official transcript of records covering the full length of studies and including full titles of the course units completed for the degree(s). If the candidate has not yet graduated, the transcript of records must include the name of the degree that will be awarded to him/her after graduation (Bachelor of, Master of, etc.). Since teaching is conducted in English an internationally recognized certificate in English is required: level B1, B2 or higher (according to the Common European Framework of Reference for Languages).

3. Description of the educational content (knowledge and skills required for a successful professional realization; general and theoretical background, specific areas of study, etc.)

Prerequisites for successful study in the master's program "Astronomy and Astrophysics" are good fundamental knowledge in physics and mathematics and basic computer skills. The total duration of studies is three semesters, starting from the winter semester (October 1) each academic year. The teaching curriculum is very liberal and contains only one compulsory course. The possibilities to select a set of course units enables the student to acquire specific theoretical and practical knowledge in topics in astronomy and astrophysics he/she is particularly interested in.

The students have to elect from a list of 24 elective courses. These elective courses must bring at least 70 ECTS credits: 30 ECTS credits in the first semester, 25 ECTS credits in the second semester and 15 ECTS credits in the third semester.

The course of study ends with defense of a master thesis. A list of possible topics and of the corresponding tutors approved by the director of the program is offered during the second semester and, at the end of the latter, the student must choose a topic. He/she has to work on the thesis in parallel to the studies in the third semester. The thesis' manuscript must be prepared by use of LaTeX. The defense of the thesis is scheduled either for February or for July.

4. Professional and general competences, specific competences

Graduates of the master's program “Astronomy and Astrophysics” shall be competent to: work with astronomical instruments in observatories and laboratories; use standard packages for processing astronomical data; understand and follow the recent scientific research in the field; work with various sources of astronomical information (data bases, catalogs etc.); to participate as investigators in scientific projects; to contribute in writing astronomical papers.

5. Professional realization (according to the National Classification of Occupations in the Republic of Bulgaria /based on the International Standard Classification of Occupations (ISCO)/ and in reference to the place of the future specialists in the National Qualifications Framework for higher education and the European Qualifications Framework for higher education)

Graduates of the master's program “Astronomy and Astrophysics” can work as research fellows in various scientific institutions and astronomical observatories and/or apply for a PhD study and/or assistant professorships in the EU countries and worldwide. They can be also employed in R&D and analytical departments in the industry, in scientific and government research laboratories.

PHA 3 0 2 1 — *Program code*

Area of Study "Astrophysics, meteorology and geophysics" / Master's Degree Program "Astronomy and Astrophysics", 3 semesters, full-time training

admission winter semester of 2024/2025 academic year

№	Course Code	Course Title	Type- C, E, O	Semester	ECTS credits	Classes - total number					Classes per week	Assessment* - e, ca, ce, cont.
						Total	Lectures	Seminars	Practical Classes/ Observation	Self study		
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
Core Subjects												
1	M 9 5 7	General Astronomy	**C/E***	**1**	**6**	**180**	**45**	**30**	**0**	**105**	**3 2 0**	**E**
2	M 9 5 8	General Astrophysics	**C/E***	**2**	**6**	**180**	**45**	**30**	**15**	**90**	**3 2 1**	**E**
3	M 9 5 9	Stellar Astrophysics	**C/E***	**2**	**6**	**180**	**45**	**30**	**0**	**105**	**3 2 0**	**E**
4	M 9 6 0	Astronomical practice	**C**	**2**	**5**	**150**	**15**	**0**	**60**	**75**	**1 0 4**	**E**
***** These courses are compulsory for students who have not earned their Bachelor degree within the program „Astronomy, Meteorology and Astrophysics" at the Faculty of Physics. Students who have taken these courses in their Bachelor study are not allowed to elect them again.												
Elective Courses – the students have to elect from a list of 24 elective courses (including the courses marked as C/E* above). These elective courses must bring at least 70 ECTS credits: 30 ECTS credits in the first semester, 25 ECTS credits in the second semester and 15 ECTS credits in the third semester												
1	M 9 6 1	Statistical Methods in Astronomy	**E**	**1**	**4**	**120**	**15**	**45**	**0**	**60**	**1 3 0**	**E**
2	M 9 6 2	Solar Physics. Solar Activity.	**E**	**1**	**4**	**120**	**45**	**15**	**0**	**60**	**3 1 0**	**E**
3	M 9 6 3	Modern Observational Methods in Astronomy	**E**	**1**	**4**	**120**	**30**	**30**	**0**	**60**	**2 2 0**	**E**
4	M 9 6 4	Modern Ideas in Astronomy	**E**	**1**	**3**	**90**	**30**	**15**	**0**	**45**	**2 1 0**	**E**
5	M 9 6 5	Stellar Atmospheres	**E**	**1**	**4**	**120**	**30**	**15**	**0**	**75**	**1 2 0**	**E**
6	M 9 6 6	Photometric Methods in Astronomy	**E**	**1**	**6**	**180**	**30**	**30**	**30**	**90**	**2 2 2**	**E**
7	M 9 6 7	The Andromeda Galaxy	**E**	**1**	**3.5**	**105**	**30**	**15**	**0**	**60**	**2 1 0**	**E**
8	M 9 6 8	Galactic Astronomy	**E**	**1**	**4**	**120**	**30**	**30**	**0**	**60**	**2 2 0**	**E**
9	M 9 6 9	Writing Astronomical Papers	**E**	**1**	**4.5**	**135**	**30**	**0**	**30**	**75**	**2 0 2**	**E**
10	M 9 7 0	High-luminosity Stars	**E**	**2**	**5**	**150**	**45**	**30**	**0**	**75**	**3 2 0**	**E**
11	M 9 7 1	Cosmology	**E**	**2**	**4**	**120**	**45**	**15**	**0**	**60**	**3 1 0**	**E**
12	M 9 7 2	Active Galactic Nuclei	**E**	**2**	**4**	**120**	**45**	**15**	**0**	**60**	**3 1 0**	**E**
13	M 9 7 3	Nonstationary Stars	**E**	**2**	**4**	**120**	**45**	**15**	**0**	**60**	**3 1 0**	**E**
14	M 9 7 4	Radioastronomy	**E**	**2**	**6**	**180**	**45**	**0**	**45**	**90**	**3 0 3**	**E**

15	M	9	7	5	Exoplanets and Search for Life in the Cosmos	**E**	**2**	**4**	**120**	**45**	**15**	**0**	**60**	**3 1 0**	**E**
16	M	9	7	6	Communication of Astronomy	**E**	**2**	**4**	**120**	**30**	**30**	**0**	**60**	**2 2 0**	**E**
17	M	9	7	7	Introduction and Modern Trends in Space Weather Research	**E**	**2**	**3.5**	**105**	**30**	**15**	**0**	**60**	**2 1 0**	**E**
18	M	9	7	8	Astrospectroscopy	**E**	**3**	**4**	**120**	**15**	**0**	**45**	**60**	**1 0 3**	**E**
19	M	9	7	9	Surface Photometry of Galaxies	**E**	**3**	**5**	**150**	**30**	**30**	**0**	**90**	**2 2 0**	**E**
20	M	9	8	0	Stellar Structure and Evolution	**E**	**3**	**5**	**150**	**45**	**15**	**0**	**90**	**3 1 0**	**E**
21	M	9	8	1	Interstellar Medium and Star Formation	**E**	**3**	**5**	**150**	**45**	**15**	**0**	**90**	**3 1 0**	**E**

Optional courses

1	M	9	8	2	Nanosatellites	**O**	**2**	**3.5**	**105**	**15**	**30**	**0**	**60**	**1 2 0**	**E**
2	M	9	8	3	Theory and Practice of Satellite Communications	**O**	**2**	**3.5**	**105**	**15**	**30**	**0**	**60**	**1 2 0**	**E**

Internships

№	code	Internship	Type- C, E, O	Semester	ECTS credits	weeks	hours	Форма на контрол* - И, ТО, КИ

Degree Completion

Form of degree completion	ECTS credits	First State Exam Session	Second State Exam Session
Defence of a Master thesis	**15**	**February**	**July**

The curriculum has been approved by the Faculty Council, Record of Proceedings № 17/12.12.2023

DEAN:.....

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Sofia University "St. Kliment Ohridski"

Curriculum Reference Statement

Area of Study "Astrophysics, meteorology and geophysics" / Master's program in "Astronomy and Astrophysics"
form of study full time length of study: 3 Semesters

Course hours, ECTS credits and number of grades per semester

Type of courses	I			II			III			IV			V			VI			VII			VIII			IX			X			Общо		
	course hours	ECTS credits	number of grades	course hours	ECTS credits	number of grades	course hours	ECTS credits	number of grades	course hours	ECTS credits	number of grades	course hours	ECTS credits	number of grades	course hours	ECTS credits	number of grades	course hours	ECTS credits	number of grades	course hours	ECTS credits	number of grades	course hours	ECTS credits	number of grades	course hours	ECTS credits	number of grades	course hours	ECTS credits	number of grades
compulsory courses	**0**	**0**	**0**	**75**	**5**	**1**	**0**	**0**	**0**																						**75**	**5**	**1**
min. elective courses	**450**	**30**	**7**	**375**	**25**	**6**	**225**	**15**	**3**																						**1050**	**70**	**16**
optional courses	**0**	**0**	**0**	**90**	**7**	**2**	**0**	**0**	**0**																						**90**	**7**	**2**
internships																																	
Total:	**450**	**30**	**7**	**450**	**30**	**7**	**225**	**15**	**3**																						**1125**	**75**	**17**

Form of degree completion	ECTS credits	Study Hours	First State Exam session	Second State Exam Session
Defence of an Master's thesis	**15**	**450**	**February**	**July**

Acquired Professional Qualification **Master of Science in "Astrophysics, meteorology and geophysics" – Astronomy and Astrophysics**

Record of Proceedings of the Faculty Council № 17/12.12.2023

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