



Appendix I Teaching outcomes of the degree programme (art. 1.3)

The master graduate in Astronomy...

1. Knowledge, skills, and insight

1.1 The MSc masters the fundamental astronomical and astrophysical concepts as well as the necessary tools from physics, mathematics and computer science including modeling skills. The level of these skills permits admission to PhD studies

1.2 The MSc is familiar with the quantitative character of astronomy and astrophysics, and with the relevant research methods

1.3

- The MSc who has completed the Astronomy track has operational knowledge in an observational or theoretical astronomical or astrophysical subarea and knowledge of the state-of the art in at least one specific research area

- The MSc who has completed the Instrumentation and Informatics track has operational knowledge in the area of instrumentation and information technology in astronomy, physics, and/or space research and knowledge of the state-of the art in at least one specific research area

- The MSc who has completed the Business and Policy track has operational knowledge of and insight into the functioning of companies and administrations, as well as the relevant legislation and knowledge of the state-of the art in at least one specific research area

2. Application of knowledge and skills

2.1 The MSc is capable to carry out research, aimed at understanding of astronomical phenomena, both observational and theoretical

2.2 The MSc is capable to analyse a (new) complex astrophysical problem, and develop a structured and well-planned research/modeling approach

2.3 The MSc is capable to apply his/her specific knowledge and skills in his/her own and related subject areas

2.4 The MSc is capable to collaborate in a (multi-disciplinary) team and has basic skills to manage a (collaborative) project

3. Judgment

3.1 The MSc is capable to obtain relevant information using modern information channels, and to interpret this information critically in the context of an absolute standard

3.2 The MSc is capable to judge his/her and others' actions within a scientific context, taking societal and ethical aspects into account

3.3 The MSc is able to draw conclusions on the basis of limited or incomplete information, and is able to realize and formulate the limitations of such conclusions

3.4 The MSc is acting and conducting research according to the VSNU Code of Conduct for Academic Practice

4. Communication skills

The MSc is capable to communicate clearly, verbally and in writing, on his/her subject and relevant applications, at a level which is understandable to experts and non-experts, and using modern communication tools



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5. Learning skills

The MSc is capable to also address issues outside his/her main subject area, therefore and thereby gaining new knowledge and skills



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Appendix II Specializations of the degree programme (art. 2.2)

The degree programme has the following specializations:

- Theoretical and Observational Astronomy (Quantum Universe)
- Instrumentation and Informatics
- Science, Business and Policy



Appendix III Content of the degree programme (art. 2.3)

Specialization Theoretical and Observational Astronomy (Quantum Universe)

Course unit	ECTS	Practical	Entry Requirements
General Relativity	5		
Electrodynamics of Radiation Processes	5		
Particle Physics Phenomenology	5		
Student seminar Quantum Universe	5		
Astrophysics Core Courses	20	see app. IV	see app. IV
Optional Courses in Theoretical and Observational Astronomy (Quantum Universe)	20	see app. IV	see app. IV
Astronomy colloquium	-		
Master Research Project Astronomy	60	X	

The assessment method of the courses can be found in the assessment plan of the degree programme and on Ocasys

Specialization Instrumentation and Informatics

Course unit	ECTS	Practical	Entry Requirements
General Relativity	5		
Electrodynamics of Radiation Processes	5		
Particle Physics Phenomenology	5		
Student seminar Quantum Universe	5		
Project Information Technology	10	X	
Optional courses in Instrumentation and Informatics	30	see app. IV	see app. IV
Internship in Industry	20	X	
Astronomy colloquium	-		
Master Research Project Astronomy	40	X	

The assessment method of the courses can be found in the assessment plan of the degree programme and on Ocasys

Specialization Science, Business and Policy

Course unit	ECTS	Practical	Entry Requirements
Astrophysics Core Courses	20	see app. IV	see app. IV
Optional Courses in Theoretical and Observational Astronomy (Quantum Universe)	10	see app. IV	see app. IV
Introduction Science, Business and Policy	20		
Internship Science, Business and Policy	40	X	
Astronomy colloquium	-		
Master Research / Thesis	30	X	

The assessment method of the courses can be found in the assessment plan of the degree programme and on Ocasys



Appendix IV Electives (art. 2.4)

Astrophysics Core Courses

Course unit	ECTS	Practical	Entry Requirements
<i>Yearly courses</i>			
Formation and Evolution of Galaxies	5		
<i>Biennial courses, offered in 2015-2016</i>			
High-Energy Astrophysics	5	X	
Dynamics of Galaxies	5		
<i>Biennial courses, offered in 2016-2017</i>			
Stellar Structure and Evolution	5		
Cosmic Structure Formation	5		
Star and Planet Formation	5		

The assessment method of the courses can be found in the assessment plan of the degree programme and on Ocasys

Optional Courses in Theoretical and Observational Astronomy (Quantum Universe)

Course unit	ECTS	Practical	Entry Requirements
<i>Yearly courses</i>			
Statistical Signal Processing	5		
Inter Academy Course	5		
<i>Biennial courses, offered in 2015-2016</i>			
Basic Detection Techniques	5	X	
Space Mission Technology	5		
Geometry and Topology	5		
<i>Biennial courses, offered in 2016-2017</i>			
Interferometry	5		
Geometry & Differential Equations	5		
<i>Quantum Universe Courses</i>			
Computational Physics	5	X	
Fundamental Constants	5		
Lie Groups in Physics	5		
Quantum Field Theory	5		
Big Experiments			
Statistical Methods in Physics	5		
Elementary Particle Physics	5		
Introduction to Plasma Physics	5		
Mathematical Methods of Physics			

The assessment method of the courses can be found in the assessment plan of the degree programme and on Ocasys



Optional Courses in Instrumentation and Informatics

Course unit	ECTS	Practical	Entry Requirements
Yearly courses			
Control Engineering	5	X	
Robotics	5	X	
Imaging Techniques in Radiology 1	5		
Mechatronics	5		
Principles of Measurement Systems	5		
Scientific visualization	5	X	
Statistical Signal Processing	5		
Device Physics	5		
Numerical Mathematics 2	5	X	
Exp. methods of trace gas research	5	X	
Instrumentation related physics courses on approval of the board of examiners		See app. III or IV of the corresponding programme	See app. III or IV of the corresponding programme
Biennial courses, offered in 2015-2016			
Basic Detection Techniques	5	X	
Virtual Observations (Capita selecta)	3		
Space Mission Technology	5		
Option group			
Inter Academy Course	5		
Biennial courses, offered in 2016-2017			
Interferometry	5		
Option group			
Stellar Structure and Evolution	5		
Cosmic Structure Formation	5		
Inter Academy Course	5		
Star and Planet Formation	5		

The assessment method of the courses can be found in the assessment plan of the degree programme and on Ocasys

For the specialization Instrumentation & Informatics a maximum of 10 ECTS may be chosen from the capita selecta below or the option groups in the table above.

Capita Selecta Courses

Course unit	ECTS	Practical	Entry Requirements
2015-2016			
Cosmic Star Formation History	3		
Cosmic Web	3		
Active Galactic Nuclei	3		
Milky Way	3		
History of Modern Astronomy	3		
La Palma Observation Trip	3	X	
Astrochemistry	3		
Virtual Observations	3		



Capita Selecta Courses (Continued)

Course unit	ECTS	Practical	Entry Requirements
<i>2016-2017*</i>			
Gravitational Lensing	3		
HI in the Universe	3		
Gas Flow in Galaxies	3		
La Palma Observation Trip	3	X	
Chemical Evolution of Galaxies	3		
Exoplanets	3		

The assessment method of the courses can be found in the assessment plan of the degree programme and on Ocasys

* The capita selecta courses for 2016/2017 are not guaranteed. The courses are decided on short notices by the teacher him/herself



Appendix V Entry requirements and compulsory order of examinations (art. 3.2)

For students admitted to the programme there are no entry requirements for the individual Modules.

Appendix VI Admission to the degree programme and different specializations (art. 4.1.1 + art. 4.2)

Holders of the following Bachelor's degrees from the University of Groningen are considered to have sufficient knowledge and skills and will be admitted to the Master's degree programme in Astronomy on that basis:

- BSc Sterrenkunde



Appendix VII

Application deadlines for admission (art. 4.6.1)

Deadline of Application	Non-EU students	EU students
Nanoscience	February 1st 2015	May 1 st 2015
Behavioural and Cognitive Neurosciences	May 1st 2015	May 1st 2015
Biomolecular Sciences (topprogramme)	May 1st 2015	May 1st 2015
Evolutionary Biology (topprogramme/EM)	January 15th 2015	January 15th 2015
Remaining FMNS Masters	May 1st 2015	May 1st 2015

Decision deadlines (art. 4.6.3)

Deadline of Decision	Non-EU students	EU students
Nanoscience	June 1st 2015	June 1st 2015
Behavioural and Cognitive Neurosciences	June 1st 2015	June 1st 2015
Biomolecular Sciences (topprogramme)	June 1st 2015	June 1st 2015
Evolutionary Biology (topprogramme/EM)	June 1st 2015	June 1st 2015
Remaining FMNS Masters	November 1st 2015	November 1st 2015