

STUDY GUIDE 2014-2015

ASTRONOMY

Master Programme

UNIVERSITY OF GRONINGEN

Faculty of Mathematics and Natural Sciences
Graduate School

The information in this study guide can also be found on the [Internet](#)

More detailed information, such as timetables of classes and examinations, can also be found through this Internet address.

Composition:
R. Straatman
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1 General Information

1.1 Introduction

This study guide contains information on programmes, facilities, important university offices, financial matters, rules and regulations etc. for master students in Astronomy for the academic year 2014-2015. This information can also be found through the website of the [Kapteyn Institute](#).

In case of individual situations or circumstances for which this study does not provide sufficient information, it is advised to consult the student counsellor.

1.2 Degree in Astronomy

The University of Groningen offers the opportunity to study Astronomy as a degree course. Graduates of this master programme are awarded the degree Master of Science (M.Sc.). The equivalent Dutch degree is "Doctorandus (Drs)".

1.3 Graduate School

The Faculty of Mathematics and Natural Sciences comprises an undergraduate school (USS), a graduate school (GSS), an education support centre and thirteen research institutes.

In the field of Astronomy the following centre of research is important

- [Kapteyn Institute](#)

The director of the Kapteyn Institute is

- Prof.dr. R.F. Peletier

The greater part of the scientific staff in the field of Astronomy is active in this research institute, while taking part in teaching activities of the undergraduate and graduate school. The Master programme Astronomy is part of the graduate school.

The board of the graduate school is directly or indirectly responsible for all matters concerning the programme which have been delegated by the board of the faculty to the board of the graduate school.

For the Master programme Astronomy the person responsible is:

- Prof.dr. I.E.E. Kamp (adjunct director of education)

1.4 Supportive staff and committees

Academic advisor for master students

- Prof. dr. R.M. Mendez (academic advisor)
- Ir. R. Straatman (Programme Coordinator)
- Ms. M.G. Alberts (Education support Center (ESC))

Course Committee (opleidingscommissie, OC)

Matters related to the course curriculum are discussed in the Course Committee. The Course Committee has an advisory responsibility with respect to the content of course programmes, with respect to the evaluation of course units and with respect to various other educational issues that may arise. The Course Committee also reviews the Teaching and Examination Regulations (OER) annually. The committee advises to the Board of the Faculty, to the Board of School of Science and Technology, to the Director for Educational Affairs or to individual professors.

The course committee consists of four staff members and four student members, but also the director for educational affairs, the bachelor student counsellor and the coordinator generally attend the meetings of the committee. Student members of the OC are elected annually; staff members hold office for two years.

- Prof.dr. L.V.E. Koopmans (chairman)
- Ms. M.G. Alberts, (secretary)

Board of Examiners

All faculty members (permanent scientific staff) in Astronomy are members of the Board of Examiners for Astronomy. The Board of Examiners is responsible for examinations and verifies whether individual students have met the criteria for graduation. The Board of Examiners can also make decisions regarding exemption of courses or other parts of the curriculum and other special regulations. Chairman of the Board of Examiners is:

- Prof.dr. M.A.M. van de Weygaert (chairman)
- Ms. M.G. Alberts, (secretary)

1.5 Student Organizations

Fysisch-Mathematische Faculteitsvereniging (FMF)

The FMF is the student association for students in (Applied) Physics, Astronomy, (Applied) Mathematics and Computer Science. The FMF organizes several formal activities as well as informal activities such as parties and sports events. Every month the FMF organizes a free cinema and borrels (informal drinks). The FMF also organizes study related activities; symposia, talks and study trips. Do not hesitate to visit us or join activities!



Office: Nijenborgh 4 - room 5111.0053 (behind the cafeteria)
Tel.: +31 (0) 50 - 363 4155
E-mail: Bestuur@fmf.nl
Internet: www.fmf.nl

1.6 Professional Organizations

Nederlandse Astronomenclub (NAC)

The NAC (Dutch Astronomy Club) is first of all an association for professional astronomers, but bachelor and master research students can be 'aspirant-members'. The association organises scientific meetings once or twice a year. In addition the yearly 'Dutch Astronomers Conference' is held under the auspices of the NAC. More information can be found on the [website](#).

Contact persons in Groningen:

Prof.dr. P.D. Barthel

Tel.: +31 (0) 50 - 363 4086

E-mail: pdb@astro.rug.nl

Prof.dr. M.C. Spaans

Tel.: +31 (0) 50 - 363 4094

E-mail: Spaans@astro.rug.nl

Koninklijke Nederlandse Vereniging voor Weer- en Sterrenkunde (KNVWS)

The KNVWS is the association for amateur astronomers and meteorologists. Members monthly receive the popular scientific magazine ZENIT. This publication includes introductory articles of Dutch astronomers. There are national work groups for amateur practice in some areas of astronomy and national meetings are organised. One can only become a member of the division Groningen. This division organises a.o. lectures, film evenings, observation nights and excursions. Further information about the divisions can be obtained from

Drs. Th. Jurriens,
Johan Ellenbergerstraat 29,
9746AK Groningen,
Tel. +31 (0) 50 - 573 29 37,

E-mail: t.a.jurriens@rug.nl.

Administration:
Institution 'de Koepel', Observatory 'Sonnenborgh'
Zonnenburg 2,
3512 NL Utrecht
Tel.: +31 (0) 30 – 231 13 60
Website: www.astro.rug.nl/~nvws/

Contribution: Depends on the section one chooses, average € 20,- per year, (see link "Groningen" in "Lid-organisatie: regionale organisaties" on the website).
Subscription to the popular scientific monthly ZENIT costs € 55,- per year.

1.7 House rules, regulations

Fire and accidents

In case of fire or an accident call **8050** and clearly explain the situation and the location of the fire or accident.

Insurance

All students are insured via the university. This insurance consists of a collective accident insurance in combination with a collective third-party insurance during presence on grounds and in buildings (including labs) of the Rijksuniversiteit Groningen.

Restaurants and Take-aways

For opening hours of the restaurants and Take-aways, check their [website](#).
Used plates, cups, saucers and cutlery should be handed in at the window of the scullery. Plastic cups and such should be discarded in the litter bins. Smoking is prohibited in the restaurants and Take-aways.

1.8 Computer screens and RSI

Many students spend a lot of time in front of computers and are at risk of developing RSI-troubles. RSI is the abbreviation for Repetitive Strain Injury and is a generic term for all troubles involving neck, shoulders, arms, wrists and hands. These troubles can become chronic and lead to incapacitation for work and serious limitations in everyday life.

Symptoms

RSI symptoms can vary from stiffness, pain and tingling sensations to loss of strength in the above mentioned body parts. Initially the symptoms occur only during work in front of screens, but at a later stage they occur also when at rest. Eventually the troubles might occur continuously, causing pain at even the simplest of actions or making them completely impossible.

How to prevent RSI?

- Do not work at a computer for more than 6 hours a day
- Regularly relax your shoulders
- Sit up straight, use the arm rests
- Hold the upper arms vertically along the upper body
- Place the monitor, keyboard and document holder right in front of you
- Keep your wrists straight, if necessary by means of a wrist support or ergonomic keyboard

When using a mouse:

- Make the movements from your elbow rather than from your wrist
- Operate the mouse with your other hand every now and then
- Place the mouse close to you.

2 Facilities

2.1 Libraries

2.1.1 University Library (UB)

The UB functions as facility centre for the entire university community; for both the faculty- and institutional libraries and the library users.

The UB offers students many services. It contains more than 2.4 million books and articles. There are around 1600 places for study. Furthermore, the library holds a vast collection of references and educational material. About 30% of these are available at the study rooms. The remaining material is kept at closed depots. The material can be accessed via the loan facility. For further information and services of the UB one may refer to the [website](#).

University library
Broerstraat 4
9712 CP Groningen
<http://www.rug.nl/bibliotheek/services/ub>
tel.: +31 (0)50 – 363 5020

2.1.2 Library at Zernike Campus

The Duisenberg Building (building number 5411) houses the library for the faculties of Mathematics and Natural Sciences, Economics and Business, and Spatial Sciences. This library is on the 2nd floor, above the Student Plaza. In this library you can look for literature in one of our discipline-related collections, borrow or return books, or simply have a quiet place to study. You can also get library instructions at our library (how to look for scientific information) and workshops (incl. RefWorks). Visit us sometime and get to know our library and what we can offer you as a student; you are always welcome!

For current opening times, address details and a range of scientific information and workshops, please go to the [website](#). Here you will find both general and location-specific information.

General Information:

- Your student pass is also your library pass. You can use it to borrow books.
- You can search the collections and extend the loan period of borrowed books using the catalogue (catalogus.rug.nl).
- Borrowed material may be returned to any branch of the University Library.
- You can also access almost all the electronic files and collections (e-journals, e-books) outside the campus via the proxy-server.
- You can e-mail any questions to: bibliotheek@rug.nl

2.1.3 Blaauw Collection

Professor Adriaan Blaauw has collected dissertations from Groningen and other Dutch astronomy departments for many years now. His collection is being kept in the Kapteyn Institute in room 177 and a [digital catalogue](#) has been kept.

2.2 Computer facilities provided by the university

Account

With your enrolment as a student of the university you will receive a letter or email with a student number and a preliminary password to access a computer account called the UWP (Universitaire WerkPlek).

This initial password gives access to the [Password Self Service Portal](#). Please change your initial password directly after receiving the Password Self Service Portal. You can then log on to the e-mail and other computer facilities of the University of Groningen.

A student-account basically provides a number of common services all accessible with one username and password:

- access to the central servers for use of MS-Windows based applications
- access to the Internet and remote storage facilities
- an e-mail account
- access to MyUniversity
- access to Nestor (the electronic learning environment of the Rijksuniversiteit Groningen)
- and access to ProgRESS WWW where you can register for courses and exams or monitor your study progress.

E-Mail, Calendar, Drive (of Google Apps for education)

Your login name is your student number prefixed by an 's'.

Students usually access their mail with a web browser but mail can also be read using mail protocol IMAP (or via an app)

For the settings, manuals and more information please visit the [website](#).

ProgRESS WWW

ProgRESS WWW is a web application designed for students who want to access their course results or want to register for courses and exams.

You need to register in ProgRESS WWW for both courses and exams. The deadline for registering for an exam is one week before the exam takes place.

A few days after a final grade has been registered by the administration office, the grade will also appear on ProgRESS WWW. If you need an official transcript (grade report), you can print the course results and ask a secretary in the administration office for a stamp and signature.

Nestor

Nestor is the electronic learning environment (ELO) of the University of Groningen.

Nestor, contains information provided by the lecturer like lecture notes, assignments and other relevant documents. It has a *Discussion Board*, a forum used by students to exchange information and a *Drop Box* to share files with fellow students such as a group assignment that has to be reviewed by students in your group. After registering for a course in ProgRESS WWW you will automatically be enrolled in the corresponding nestor course.

My University

My University contains all the information for staff and students of the University of Groningen. You can log in to My University with your P- or S-number.

My University is your personal Dashboard that is partly occupied by information that everyone needs to access. Via your Dashboard all information from your RUG-mail, the RUG-planner, Progress and Nestor is easily accessible. You can furnish your Dashboard exactly the way you like with the help of so called widgets, e.g. Facebook, Twitter, Buienradar or OV9292. More information about save use of My University can be found [here](#).

Ocasys

Ocasys is the university course catalogue. It contains short descriptions of course contents, necessary literature, etc.

More information

For more information about network, security, available applications, helpdesk etc., have a look at the website of [IT facilities](#).

The computer group at the Kapteyn Institute has only a limited helpdesk function for problems related to the UWP.

2.3 Computer facilities at the Kapteyn Institute

In general, astronomy students will make intensive use of the computer facilities at the Kapteyn Institute. Almost all relevant software related to astronomy runs on computers

installed with UNIX/Linux. Also the environment for the development of software for astronomy is based on this platform. Therefore it is important that astronomy students get acquainted with the computer systems and programs at the institute in an early stage of their study. They get a computer account to access the Linux machines at the institute in addition to their university account. The institute's account is traditionally the same for both students and staff. There are no restrictions on using mail, personal web pages, remote access, backup, (bulk)storage and available software.

Students start using the computers in the computer cluster (room number 5419.0142). This is an air conditioned room with up-to-date computer systems, all connected to the local network and accessible from any other computer (e.g. at home).

A large HD television screen and an interactive whiteboard are available for presentations. Each desk has a power- and network adapter to facilitate laptop users. For students who need to access their university account, a Windows machine with the UWP is also available.

Master students and bachelor students who started with their research project get their own desk and work space in one of the student rooms. Each desk is equipped with a workstation for personal use. These computers usually have a lot of local disk space to speed up data processing for large data volumes.

The computer group at the Institute has a helpdesk for hardware related problems (contact either W. Zwitser, room 5419.0172 or E. Tiesinga, room 5419.0194) and software related problems (contact either J.P. Terlouw, room 5419.0176 or M. Vogelaar, head of the group, room 5419.0180).

2.4 Blaauw Observatory

In 2008 the Blaauw observatory was opened. This observatory is located on top of the Bernoulliborg (Nijenborgh 9). It is used for educational purposes as well as for demonstrations to the general public. The central instrument of the observatory is the Gratama telescope, a 40 cm mirror optical telescope of the type Ritchey-Chrétien.

Information about the telescope can be found at the website:

<http://www.rug.nl/sterrenkunde/sterrenwacht/index>

3 Study Affairs

3.1 Academic calendar

The academic year 2014/2015 starts on September 1 2014 and ends on July 10 2015. The academic year consists of two semesters each consisting of two quarters of ten or eleven weeks. The second semester starts at February 2 2015. Vacations are from the second week of July until the last week of August and the two weeks including Christmas and New Year.

Information on timetables can be found on the [website](#).

3.2 Information channels

Website of the department

The [website of the department](#) contains a fount of information about education and research. To get the latest detailed information on time and location of lectures, practicals and exams, you can go [here](#).

Mail/Notice

In some cases messages of importance to students or groups of students, like requests to sign up for certain courses or alterations in the timetables, are sent to the electronic mailbox of the students concerned. The students are for this reason expected to check their mailbox on a regularly base (at least once a week!)

Academic advisor

See section 3.5

University paper (Universiteitskrant, UK)

The UK is an independent news medium of the university of Groningen. It has a [news site](#), digital magazine and a weekly newsletter. Apart from editorial articles of general interest concerning the university community the UK publishes important announcements. The Board of Executives (College van Bestuur) frequently publishes the central rules and regulations in the UK.

3.3 Study and finances

Tuition fees

You can only participate in the Master programme as a full-time student. For EU students the annual tuition fee amounts to € 1835,-. For non-EU students the fee amounts to € 13000,-. When you already have a Master degree and want to do a second Master programme other fees will apply. You can find these [regulations and fees](#) and more information on the website. Fees do not include travel, accommodation, living and incidental costs (about € 8000,- per year). The Housing Office assists foreign students in finding accommodation.

Deadline for applications

Applications for admission for international students to the MSc-programme in Physics and Applied Physics by foreign students should be completed as early as possible, but should have reached the university admissions office (admissions@rug.nl) before April 1st (non-EU students) or May 1st (EU students).

Check the website for [application deadlines](#) and for more information about [how to apply](#). The first step in the application procedure is registering at [Studielink](#).

Study expenses

Costs of textbooks and educational tools are relatively low. For the master programme € 1000,- will cover most of the compulsory textbooks, manuals, practical materials, excursions, etc. The University of Groningen has a policy on study costs. The policy aims to control costs so that the 'study cost' component does not exceed grant/loan budgets for Dutch students.

The amount that students are required to spend on study materials will therefore not exceed the government grant. The standard sum for 2013-2014 is € 700,-. Each course phase has a cost 'ceiling' (standard sum x length of course).

Sometimes it is not possible to avoid going beyond the ceiling amount. In such cases it is possible to apply to the Faculty Board for reimbursement of half the extra expenditure on the basis of receipts submitted as proof. Sometimes another arrangement may be possible.

On the website an [overview of the costs](#) of studying in Groningen can be found. Students can also visit the University Student Desk or their academic advisor.

The direct study costs for the master programme in Physics and Applied Physics are estimated well below the maximum (appr. € 500,- per year).

3.4 Academic Advisor

The main task of the study advisors is to provide assistance to students experiencing personal and academic problems. In practice, issues such as choice of courses, study methods, choice of (future) research specialization, optional courses and career perspectives can be discussed. Academic advisor for master students in Astronomy is prof.dr. R.M. (Mariano) Mendez:

Room: 5419.0150 (Kapteyn Building)

Tel.: +31 (0) 50 – 363 4093

E-mail: r.m.mendez@rug.nl

3.5 Honours College

“Leadership: making the difference”

If you are looking for an extra challenge during your Master's degree, the master's Honours Programme organized by the University of Groningen Honours College might be just what you're looking for. The programme yearly offers 250 students, that are able and willing to excel, the possibility to deepen their theoretical knowledge about leadership and to improve their leadership skills. The programme is extracurricular and has a workload of 15 ECTS (in one year).

A place in the Honours College will offer you the possibility to enjoy additional, challenging and small-scale education from an interdisciplinary perspective. Also you will meet motivated fellow students and prominent scientists and you can participate in a variety of interesting complementary activities. This programme will provide a solid starting point for your future scientific or social career and it will contribute to your personal development.

Application

Application is possible twice a year (August and January). Students who want to follow the Master's Honours Programme should have a Bachelor's degree by September 1st or February, 1st with good to excellent results, including a Bachelor's thesis (or another project to finish a Bachelor Programme) marked above average.

Considering there are limited places, there will be a selection procedure. In the selection procedure you will be assessed on the following points:

- your grades obtained so far;
- your motivation to participate in the Master's Honours Programme;
- the potential to complete the Master's Honours Programme within the period specified (one year).

On the website more information about the [Honours Master](#) and [application and selection](#) is given or you can send an e-mail to: honours@rug.nl.

3.6 Study Abroad

All master students are in principle eligible to studying abroad. There are several possibilities such as:

- Following courses at a foreign university

The University of Groningen has exchange agreements with a number of foreign universities, which means that no fees will be raised if Groningen students study there for a mobility period.

- Research project at a foreign university
Generally this should be done in a research group abroad with existing ties with the research group in which you are doing your final research project. Contact your thesis supervisor for the possibilities.
- Internship in a company abroad.
Students in Applied Physics may do their industrial internship in a foreign company. Also in this case: Contact your thesis supervisor to consider the possibilities.

More information about studying abroad can be found on the [website](#) or consult the academic advisor (see section 3.5). The academic advisor is also the coordinator for studying abroad.

Financing the study or internship abroad

There is a number of programmes to finance your study or internship, and for travel expenses for internships - in case these are not paid for by the company, such as Socrates/Erasmus for study at a university within the EU, Marco Polo for all other destinations. You might also get a contribution from the [Groninger Universitair Fonds](#) (GUF).

Important websites for general information and how to finance your study or internship are:

www.wilweg.nl

www.nuffic.nl

www.beursopener.nl

3.7 Examinations and Graduation (Tentamens en Examens)

Examinations

Astronomy examinations for most advanced courses are generally scheduled by the teachers in consultation with the students.

Enrolment for exams

Students should enroll for written exams through [ProgressWWW](#) at least one week before the examination date. If you do not sign-up before this date, you are not allowed to take the examination.

If you cannot take part after all, you can cancel the enrolment until one day before the examination date.

Fraud

Any act of a student to mislead the examiner in such a way that a correct evaluation of the students' knowledge, insight or competences is prevented, is considered as fraud.

Examples of fraud are:

- the use of crib notes (on paper or digital);
- plagiarism (also the use of internet files without proper reference is considered as fraud);
- 'free riding' on the work of fellow students in group assignments;
- copying (laboratory) reports from fellow students;
- falsifying experimental data;

In case of fraud the Board of Examiners can exclude a student from participating in the particular exam for a period of one year.

Graduation

In order to graduate from the Master's program in Astronomy, the student has to pass for every course (including thesis research) in the course curriculum. To pass means that the final grade for the course has to be at least 6. The Board of Examiners will decide on an individual basis whether the curriculum and the grades of the student meet all requirements for graduation.

Graduation is only possible for enrolled students. It is strongly advised that the student files a request for graduation as soon as all requirements of the curriculum have been met, in order to prevent unnecessary tuition costs.

Graduation ceremony

The graduation ceremony usually takes place in the Academiegebouw, Broerstraat 5. After proper registration the student will receive a schedule with time and place of the ceremony. At the graduation ceremony the graduate receives a graduation certificate together with a diploma supplement stating the grades on the separate course units.

Usually the graduation date coincides with the date of the graduation ceremony. In some cases (usually around September 1) the graduation ceremony may be postponed to September. This may be the case when the last examination results are obtained in the last weeks of August and the administrative procedures for graduation cannot be timely fulfilled before August 31 (i.e. before the end of the academic year). When the examination results do so permit, the graduation date can be set at August 31, whereas the graduation ceremony takes place in September.

For the timetable of the graduation ceremonies one should refer to the [website](#).

3.8 Rules and Regulations

Many things treated in this study are based on formal documents approved on the basis of the Higher Education Act by the board of the university, the board of the faculty, the faculty counsel or by the board of examiners. In case of doubt or in case of conflicts it is advisable to refer to these formal documents. Of importance are the following:

3.11.1 Student charter

The Student Charter provides an overview of the rights and obligations of both students and the University. It is based on national legislation, particularly the Higher Education and Research Act (WHW), supplemented by regulations that are specific to the University of Groningen. These latter regulations are set out in the appendices to the Student Charter.

The Act stipulates that the Student Charter comprises two sections: a university-wide section and a programme-specific section.

The *university-wide section* describes the rights and obligations that apply to the university as a whole, such as registration and protection of rights. You can find this section on the [internet](#).

The university-wide section of the Student Charter does not literally quote the articles from acts and regulations but describes them as clearly as possible. The various topics are accompanied by links to the relevant articles of the act or regulation in question.

The *programme-specific sections* describe the rights and obligations that apply to specific degree programmes. These sections include the Teaching and Examination Regulations (OER), Rules and Regulations for examinations and final assessment and other regulations and provisions set by the various degree programmes and faculties. You can consult your programme-specific section at the faculty Education Offices and in the Study Guides.

Applicability

The Student Charter applies to academic year 2013-2014. The university-wide section of the Student Charter is approved annually by the Board of the University and endorsed by the University Council. In the event that the Charter challenges or contradicts any legal regulations, these legal regulations will take priority.

Publication

At the start of the academic year all students will be sent an e-mail by the Board of the University informing them where they can find the Student Charter on the internet and where they can consult a hardcopy of the Student Charter.

Using the Student Charter

All students are expected to be familiar with the contents of the Student Charter. Not complying with the rules in the Charter may affect your rights, for example the right to financial support from the Graduation Fund.

Some of these regulations may not be as hard and fast as they sound. Rules and regulations are by definition general in character, and this Student Charter is no exception. This means that the applicability of these regulations in concrete situations and individual instances is not always a predictable and straightforward matter. Students who have registered for the first time this year may find that the regulations that apply to them are different to those for students who have reregistered. Make sure you are provided with the right information by your faculty and/or the Student Service Centre (SSC) and read the Student Charter and the associated regulations carefully!

Items in the Student Charter

The university-wide section of the Student Charter contains information on the rights and obligations of students regarding the following items:

- admission,
- registration and deregistration,
- teaching, including the binding study advice,
- examinations and final assessments,
- financial assistance,
- consultative participation,
- rules of behaviour,
- legal rights.

3.11.2 Teaching and Examination Regulations (OER)

The Teaching and Examination Regulations is established by the board and council of the faculty.

It contains a number of regulations with respect to structure and content of the educational programmes, form and frequency of examinations, admission regulations, tutoring etc.

On the infonet the [OER](#) can be found.

3.11.3 Rules and Guidelines of the Board of Examiners

The Rules and Guidelines of the board of Examiners contain a number of additional regulations concerning examinations: e.g. registration for examinations, procedures for exemptions, assessment, fraud, etc.

[The Rules and Guidelines of the Board of Examiners](#) for the MSc in Physics programme can be found on the infonet.

3.9 Objection and appeal procedures

When applying rules and regulations, mistakes are sometimes made. This is why the Students' Charter (Studentenstatuut) covers provisions to ensure lawful protection of the student. If students feel unjustly treated, they can object and lodge an appeal.

The two agencies a student can contact are mentioned in the Students' Charter:

- Higher Education Appeals Tribunal (College van Beroep voor het Hoger Onderwijs). For most matters concerning the central part of the Students' Charter (see section 3.10.1).
- Board of Appeal for the Examinations (College van Beroep voor de Examens). Mostly for matters concerning the decentral part of the Students' Charter (OER). An overview of all objects and appeal procedures can be acquired on the [website](#).

Complaints

There are many situations possible where regulations of the Students' Charter (Studentenstatuut) are not directly violated, but that make the student still feel improperly or unjustly treated. In such a case he/she can file a complaint to the following agencies:

Decentral

Each of the faculties and departments has its own (specific) complaint procedure. The academic advisor can offer direct assistance, but he/she could also forward the case to, for example, the head of the Programme Committee (Opleidingscommissie) or to the director of the Graduate School.

Student Service Desk

If one cannot or wishes not to contact the faculty or department, the complaint could be discussed with a student dean at Student Service Desk. He/she will act as ombudsman and mediate, and, if requested, demand inspection of dossiers or contact professionals.

4 Master programme

4.1 Introduction

To be admitted to the master programme in Astronomy, the student must have obtained the prerequisite bachelor degree in Astronomy. In case a student does not meet this requirement, but does hold a bachelor degree in a related field, e.g. in Physics, the student can in many cases still be admitted. In this case the student must consult the academic advisor to set up an individual programme to eliminate deficiencies which need to be approved by the exam committee.

The programmes presented in this catalogue pertain to all students who start with their master studies in the academic year 2014-2015.

4.2 Course descriptions

The electronic course catalogue [OCASYS](#) contains descriptions of all course units that are offered by the University of Groningen.

It should be noted that many advanced Master's courses will be taught bi-annually. Careful planning of the master's course work is therefore required. Master courses offered by astronomical institutes elsewhere in The Netherlands can also be incorporated into the Groningen curriculum. Each year an advanced national course is offered. The topic of this course, the Interacademiale College (Inter-Academy Course) is chosen by a national committee; the course, which is nearly always taught in Utrecht, is generally taken by master students from all Dutch astronomical institutes.

4.3 Curriculum Astronomy programme

The programme comprises 120 ECTS, or two full years of study.

P-variant and M-variant

P-variant: to graduate as a scientific researcher

M-variant: to graduate for a position in the field of policy and management functions in trade and industry and public authorities, for which scientific knowledge and skills are desirable.

The studies are mostly attended on an individual basis in research projects and/or traineeships at companies/administrative bodies. Furthermore, specific courses have to be taken for each variant.

The P-variant is primarily concentrated on the profession of a researcher. This study concentrates on a continuing research in preparation for a dissertation (PhD). Obviously, students graduating the M-variant have also the opportunity to prepare for a doctor's degree.

Specializations

The P-variant of the programme offers two specializations Quantum Universe and Instrumentations and informatics in astronomy and space research, and the M-variant offers one specialization: Science, Business and Policy (Beta, Bedrijf en Beleid), that focuses on business and policy:

The table gives the ECTS credit requirements for each of the specializations

QU	Quantum Universe
I&I	Instrumentations and Informatics in astronomy and space research
B&P	Beta, bedrijf en beleid, (Beta, business and policy), largely offered in Dutch

Master's Curriculum Astronomy	QU	I&I	B&P
	ECTS	ECTS	ECTS
Electrodynamics of Radiation Processes	5	5	
General Relativity	5	5	
Introduction Science, Business and Policy			20
Particle Physics Phenomenology	5	5	
Student Seminar Quantum Universe	5	5	
Project Information Technology		10	
Industrial internship		20	
Internship B&P			40
Astrophysics core courses	20		30
Optional courses I&I		30	
Optional Quantum Universe courses	20		
Master research/thesis	60	40	30
Astronomy Colloquium*	p.m.	p.m.	p.m.
	120	120	120

*Students are obliged to attend 10 sessions.

4.4 List of Astrophysics Core Courses

	ECTS	2014/2015	2015/2016
Dynamics of Galaxies	5		x
Cosmic Structure Formation	5	x	
High Energy Astrophysics	5		x
Formation and Evolution of Galaxies	5	x	x
Star and Planet formation	5	x	
Statistical Signal Processing	5	x	x
Stellar Structure and Evolution	5	x	

List of Capita Selecta Courses

Capita Selecta in 2014-2015:	ECTS
Chemical Evolution of Galaxies	3
Exoplanets	3
Gas flows in galaxies	3
Gravitational Lensing	3
HI in the Universe	3
La Palma Observation Trip	3
Capita Selecta in 2015-2016:	ECTS
Active galactic nuclei	3
Astrochemistry	3
Dark Energy	3
Epoch Reionization	3
Starburst Galaxies	3
Virtual Observations	5

4.5 List of Optional Courses Instrumentation and Informatics

	ECTS	2014/2015	2015/2016
Basic Detection Techniques	5		x
Control Engineering	5	x	x
Device Physics	5	x	x
Dark Energy (capita selecta)	3		x
Experimental Methods of Trace Gas Research	5	x	x
Imaging Techniques in Radiology 1	5	x	x
Interferometry	5	x	

List of Optional Courses Instrumentation and Informatics (cont.)

	ECTS	2014/2015	2015/2016
Mechatronics	5	x	x
Numerical Mathematics 2	5	x	x
Principles of Measurement Systems	5	x	x
Robotics	5	x	x
Scientific Visualisation	5	x	x
Statistical Signal Processing	5	x	x
Space Mission Technology	5		x
Virtual Observations (capita selecta)	5		x

For the specialization Instrumentation & Informatics a maximum of 10 ECTS may be chosen from the other capita selecta courses from the table in section 4.4.

4.6 List of Optional Courses in Quantum Universe

	ECTS	2014/2015	2015/2016
Active Galactic Nuclei (capita selecta)	5		x
Astrochemistry (capita selecta)	3		x
Basic Detection Techniques	5		x
Big Experiments	5	x	x
Chemical Evolution of Galaxies	3	x	
Computational Physics	5	x	x
Dark Energy (capita selecta)	3		x
Elementary Particles	5	x	x
Epoch Reionization (capita selecta)	3		x
Exoplanets (capita selecta)	3	x	
Fundamental Constants	5	x	x
Gas flows in galaxies (capita selecta)	3	x	
Geometry & Differential Equations	5	x	
Geometry & Topology	5		x
Gravitational lensing (capita selecta)	3	x	
HI in the Universe (capita selecta)	3	x	
Inter Academy Course	5	x	x
Interferometry	5	x	
Introduction to Plasma Physics	5	x	x
La Palma Observation Trip (capita selecta)	3	x	
Lie Groups in Physics	5	x	x
Mathematical methods in Physics	5	x	x
Quantum Field Theory	5	x	x
Space Mission Technology	5		x
Starburst Galaxies (capita selecta)	3		x
Statistical Methods in Physics	5	x	x
Virtual Observations (capita selecta)	5		x

Inter Academy course/Interacademiaal college

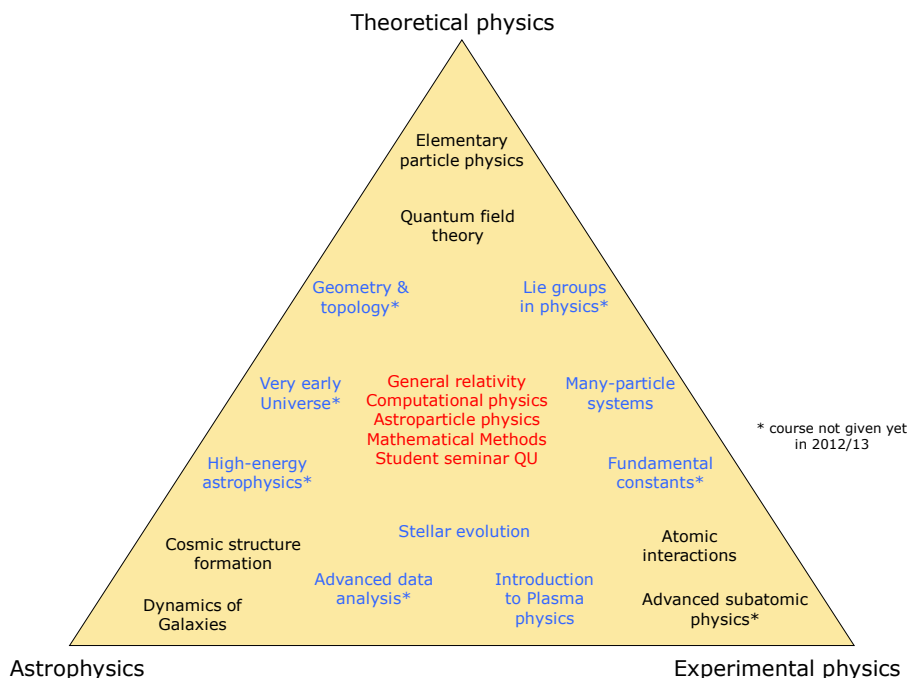
Coordinator is prof. dr. F.W.M. Verbunt (University of Utrecht). Further information will be announced on the website www.rug.nl/sterrenkunde.

4.8 Further Information on the specializations

4.8.1 Quantum Universe

The specialization *Quantum Universe* of both the Physics and Astronomy Master programmes is a collaboration between the Centre for Theoretical Physics (CTN), the Kapteyn Astronomical Institute and the Kernfysisch Versneller Instituut (KVI), and will emphasize the relations between Theoretical Physics, Particle Physics and Astronomy in the study of nature on different scales.

The exact requirements of the programme as implemented in 2014-2015 are given in Section 4.2. In the figure on the next page, the programme is explained graphically. In the middle of the triangle the five compulsory core Quantum Universe courses are given. In addition to these courses a student must choose (at least) three elective Quantum Universe courses: in each corner of the triangle two courses of special interest for respectively Theoretical Physics, Experimental Physics, and Astrophysics are denoted, furthermore along each base of the triangle three courses of mutual interest for the fields mentioned in the adjoining corners are denoted.



4.8.2 Instrumentation and Informatics in Astronomy and Space Research

The specialization 'Instrumentation and Informatics in Astronomy and Space Research' aims at students in Physics, Applied Physics and Astronomy who want to specialize in advanced instrumentation and informatics. Specialists in this field are of great value in fundamental and applied research in several areas of astronomy and space research. For instance, at the University of Groningen, this specialization constitutes a collaboration with the 'Kapteyn Laboratorium', the 'National Institute for Space Research (SRON), ASTRON, the Nuclear Accelerator Institute and the Centre for Isotope Research.

The course curriculum of the specialization Instrumentation and Informatics can be found in chapter 4 and contains a number of mandatory courses in instrumentation and informatics, optional courses and further courses in astronomy, physics and applied physics. The Master's research project is carried out in one of the above mentioned research institutes and should be astronomy oriented. Students considering specializing in Instrumentation and Informatics are recommended to take a minor Instrumentation and Informatics in the bachelor programme.

4.8.3 Science, Business and Policy

The specialization Science, Business and Policy is a specialization of almost every Master's programme offered by the FWN. The aim of this specialization is to combine knowledge and insights from other disciplines, in particular management, organization and public administration.

The combination of Physics and Business and Policy is created for students interested in working for a (medium or big) science-oriented company.

The first year of the specialization is aimed at deepening the knowledge of physics and astronomy and doing a Research in this field/

The second and final year consists of the course 'Introduction Science, Business and Policy' and the combined internship/research 'Internship Business and Policy'. The course 'Introduction Science, Business and Policy' offers an introduction into the disciplines 'Management and Organization' and 'Public Administration'. You will apply the knowledge you have acquired in this course to multidisciplinary projects assigned by companies and the government.

The core of the combined internship/research project 'Internship Business and Policy' consists of an internship of six months with a company or institution. An internal internship at the university is also among the possibilities. The internship deepens the knowledge you acquired during the course 'Introduction Science, Business and Policy' and offers an in-depth introduction and practice with project management. The internship will be enriched with lectures, training sessions and exchange of experiences and briefings during two introductory weeks and an evaluation week.

The specialization Science, Business and Policy is conducted in Dutch, and is therefore not accessible to those who have no command of this language.

For more information on this specialization, please consult:

Drs. A.J. Abma (lecturer and coordinator)

Tel. +31 (0) 50 - 363 2263

E-mail: a.j.abma@rug.nl

5 Contact data

5.1 Kapteyn Institute

Telephone number = 050 - 363 + Extension

	Extension	E-mail	Kamer (5419.0...)
Department Chair R.F. Peletier, Prof.dr.	6674	R.F.Peletier@astro.rug.nl	164
Director for Educational Affairs I.E.E. Kamp, Prof.dr.	4070	Kamp@astro.rug.nl	175
Secretariat			
M.G. Alberts	4079	secr@astro.rug.nl	178
G.F. Meijering-Swint, drs.	4073	secr@astro.rug.nl	178
H.P. Zondervan-Kimsma	4075	secr@astro.rug.nl	173
J.I. Zwegers-Morris	4073	secr@astro.rug.nl	178
Programme coordinator R. Straatman, Ir.	4873	escphysics@rug.nl	5161.0155
Student counsellor			
Bachelor students: G.J. Zondervan, Drs.	4310	G.J.Zondervan@rug.nl	5161.0049
Master students: R.M. Méndez, Prof.dr.	4093	M.Mendez@astro.rug.nl	150
Student administration			
M.G. Alberts	4079	gineke@astro.rug.nl	178
Staff members			
Barthel, prof.dr. P.D.	4064	P.D.Barthel@astro.rug.nl	156
Begeman, dr. K.	2454	K.Begeman@astro.rug.nl	129
Boxhoorn, drs. D.R.	2454	D.R.Boxhoorn@astro.rug.nl	129
Bruyn, prof.dr. A.G. de	4057	A.G.de.Bruyn@astro.rug.nl	152
Caputi, dr. K.I.	8325	K.I.Caputi@astro.rug.nl	144
Cazaux, dr. S.M.	4090	s.m.cazaux@astro.rug.nl	199b
Fraternali, prof. dr. F.	4090	F.Fraternali@astro.rug.nl	199b
Gorkom, prof.dr. J.H. van	8325	J.H.van.Gorkom@astro.rug.nl	144
Helmi, dr. A.	4045	A.Helmi@astro.rug.nl	190
Helmich, drs. E.M	4548	E.M.Helmich@astro.rug.nl	133
Helmich, dr. F.P.	4799	F.P.helmich@astro.rug.nl	294
Hulst, prof.dr. J.M. van der	4054	J.M.van.der.Hulst@astro.rug.nl	150
Jones, prof.dr. B.	4087	B.Jones@astro.rug.nl	187
Kamp, dr. I.E.E.	4070	I.Kamp@astro.rug.nl	175
Koopmans, dr. L.V.E.	6519	L.V.E.Koopmans@astro.rug.nl	160
McFarland, dr. J.P.	8326	J.P.McFarland@astro.rug.nl	147
Méndez, prof.dr. R.M.	4093	M.Mendez@astro.rug.nl	150
Morganti, dr. R.	4080	R.Morganti@astro.rug.nl	179
Oosterloo, dr. T.A.	4080	T.A.Oosterloo@astro.rug.nl	179
Peletier, prof.dr. R.F.	6647	R.F.Peletier@astro.rug.nl	141
Roelfsema, dr. P.P.	4043	P.R.Roelfsema@astro.rug.nl	293
Shipman, dr. R.F.	7753	R.F.Shipman@astro.rug.nl	286
Spaans, prof.dr. M.C.	4092	M.C.Spaans@astro.rug.nl	281

Tak, dr. F.F.S. van der	8753	vdtak@astro.rug.nl	294
Tolstoy, prof.dr. E.	8323	E.Tolstoy@astro.rug.nl	195
Trager, dr. S.C.	6625	S.C.Trager@astro.rug.nl	158
Valentijn, prof.dr. E.A.	4011	E.A.Valentijn@astro.rug.nl	139
Verdoes Kleijn, dr. G.	8326	G.Verdoes@astro.rug.nl	147
Verheijen, dr. M.A.W.	4077	M.A.W.Verheijen@astro.rug.nl	284
Vogelaar, drs. M.G.R.	4096	M.G.R.Vogelaar@astro.rug.nl	180
Voort, dr. L. van der	4076	L.van.der.Voort@astro.rug.nl	166
Weijngaert, prof.dr. M.A.M. van de	4086	R.van.de.Weygaert@astro.rug.nl	186
Zaroubi, prof.dr. S.	4055	S.Zaroubi@astro.rug.nl	282

5.2 University contact data

ADDRESSES FOR STUDENTS

University Student Desk (USD)

Visiting address: Broerstraat 5

Postal address: P.O. Box 72, 9700 AB Groningen, the Netherlands

Telephone: +31 (0) 50 – 363 8004

Internet:

[Ins and Outs](#)

[Address and opening hours USD](#)

International Service Desk (ISD)

Visiting address: Broerstraat 5

Postal address: P.O. Box 72, 9700 AB Groningen, the Netherlands

Telephone: +31 (0)50 – 363 8181

E-mail: isd@rug.nl

Internet: [International Service Desk](#)

Student Service Centre

Visiting address: Uurwerkersgang 10

Postal address: P.O. Box 72, 9700 AB Groningen, the Netherlands

Telephone: +31 (0) 50 – 363 8066

Email: ssc-secretariaat@rug.nl

Internet: [Student Service Centre](#)

Talent and Career Center (T&CC)

Visiting address: Munnekeholm 2, 9711 JA Groningen

Postal address: P.O. Box 7117, 9701 JC Groningen, the Netherlands

Telephone: +31 (0) 50 – 311 1589

E-mail: info@talentcareercenter.nl

Internet: www.talentcareercenter.nl

Central Portal for the Legal Protection of Student Rights (CLRS).

Postal address: P.O. Box 72, 9700 AB Groningen, the Netherlands

Internet:

[Board of Appeal for Examinations \(CBE\)](#)

[Complaints, objection and appeal](#)

University Funds Committee (UFC)

Postal address: P.O. Box 72, 9700 AB Groningen, the Netherlands

E-mail: ufc@rug.nl

GENERAL ADDRESSES

Board of the University (CvB)

Postal address: P.O. Box 72, 9700 AB Groningen, the Netherlands

Telephone: +31 (0) 50 – 363 5285

University Council (U-raad)

Postal address: P.O. Box 72, 9700 AB Groningen, the Netherlands

Telephone: +31 (0) 50 – 363 8535

E-mail: uraad@rug.nl

Internet: www.rug.nl/uraad

Legal Affairs Office (ABJZ)

Postal address: P.O. Box 72, 9700 AB Groningen, the Netherlands

Telephone: +31 (0) 50 – 363 5440

E-mail: abjz@rug.nl

Internet: [ABJZ](#)

Donald Smits Center for Information Technology (CIT)

Visiting address: Zernikeborg, Nettelbosje 1

Postal address: P.O. Box 11044, 9700 CA Groningen, the Netherlands

Telephone: +31(0) 50 – 363 9200

E-mail: secretariaat-cit@rug.nl

Internet: [CIT](#)

CIT Helpdesk

Telephone: +31 (0) 50 – 363 3232

E-mail: servicedesk-centraal@rug.nl

Health, Safety and Environment Service (AMD)

Visiting address and postal address: Visserstraat 49, 9712 CT Groningen, the Netherlands

Telephone: +31 (0) 50 – 363 5551

E-mail: amd@rug.nl

Internet: [AMD](#)

Office of the Confidential Advisor

Marijke Dam, Confidential Advisor

Visiting and postal address: Visserstraat 47, 9712 CT Groningen, the Netherlands

Telephone: +31 (0) 50 – 363 5435

E-mail: j.m.dam@rug.nl

Internet: [Confidential advisor](#)

Complaints Committee for harassment, sexual harassment and aggressive, violent or discriminatory behaviour

Postal address:

Antwoordnummer 172,

9700 AB Groningen