Faculty of Science

Prospectus 2007 - 2008

Environmental Sciences

Master

Radboud University Nijmegen

Preface

This booklet is the prospectus for the masters programme Environmental Sciences of the Faculty of Science. It contains information about objectives, the goals and the contents of the programme. Furthermore a lot of practical information is given.

This prospectus is free of charge and is available at the office of BioSciences (HG. 00.114) for all the MSc students Environmental Sciences. The information in this prospectus is also available on website: www.studiegids.science.ru.nl/2007

All general information for students regarding the university, accommodations-living-well-being, finances, student grants and loans, admission and registration, services provided, student facilities, associations and organisations for students, student and legal position (students' statute) and moreover, all of the useful addresses and telephone numbers can be found in the **Handbook and students' statute**. It is available (as is this prospectus) at the Secretarial Office BioSciences. The information provided in the handbook is also available via the new homepage of the Student Affairs Department: www.ru.nl/studentenzaken.

The Educational Institute Biosciences observes the privacy regulations and will therefore not make any personal particulars public.

The prospectus is mainly meant as an aid for the student. If, upon using this prospectus, something is not clear to you or proves to be incorrect, or if you have any suggestions, please report this to the educational advisor or the office of BioSciences.

This prospectus has been made with great care. However the author is not responsible for inaccuracies. If you have comments or proposals for improvement don't hesitate to contact her.

Mrs H.W.J. Becks MSc
e-mail: m.becks@science.ru.nl

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1 General Information

1.1 Introduction

'How do pesticides end up in the food of humans and animals and what are the risks?' 'What are the risks for those who live in the vicinity of an industrial estate?' 'Is a car that runs on hydrogen more environmentally friendly compared to one that runs on petrol?' 'What will happen to an important natural area like the Wadden Sea if the climate in the Netherlands changes and the sea level rises?'
These are all questions to which we want answers!
Environmental scientists are concerned with questions of this kind and try to find answers. Environmental Science is the discipline concerned with the study of environmental problems with a view determining how to go about solving these problems or, even better, preventing them.

Environmental problems are quite complex and they require a multidisciplinary approach. Consider, for example, the problem of water pollution. It involves various environmental aspects, such as excessive algal growth, the toxic effects of poisonous substances, the effectiveness of sewage treatment plants, the benefit of sewerage charges, granting discharge permits, et cetera. In order to come to a solution, you have to look at the problem from various scientific angles. The sections of these separate areas of research that focus on environmental research are environmental specialisms. These include biology, chemistry, physics, law, economy, geography and the biomedical sciences. These specialisms conduct research into environmental problems and subsequently contribute to understanding the issues at hand. And so, in solving the problems, it will not suffice to have various disciplines focus on the same problem. They must also combine all of their knowledge in order to reach an overall solution to environmental problems. Environmental Science is the field of science that focusses on this integration. It aims to develop concepts and models that enable this integration.

1.2 Organisation Environmental Sciences

Admittance

The programme requires a Bachelor degree in Environmental Sciences from the University of Nijmegen, or an equivalent degree. For example a bachelor degree in Biology, Physics, Natural Sciences, Chemistry or Biomedical Sciences from any Dutch university qualifies.

Aims and attainment targets

Aim

The field of study of Environmental Science is so extensive, that one cannot thoroughly master all of the aspects involved. And so you must specialise. Environmental Sciences focuses on generating environmental scientists who have a clear view of how other (scientific) disciplines can contribute to solving environmental issues, in addition to having completed extensive (specialist) training in one of the scientific disciplines (biology, chemistry or natural science). The master Environmental Sciences (ES) aims to have the graduate gain insight into and acquire knowledge of the field of environmental science in such a way that he/she can

independently practise his/her profession and will qualify, if desired, for advanced training in scientific research or designing.

Final attainment levels Master Environmental Sciences
The competences that apply to the Master ES are stated below.

Researcher- design
Based on up-to-date scientific knowledge, insights and skills, a master of Environmental Sciences is able to independently describe complex environmental science issues and can reduce these to a verifiable question.

Researcher - executing and interpreting/analysing
A master of Environmental Sciences can independently apply scientifically sound research methods, techniques and research instruments upon analysing a complex environmental science issue presented by a commissioning party.
He/she designs and carries out the research, processes and interprets the results, draws unambiguous conclusions based on these and formulates relevant recommendations concerning subsequent research, environmental policy and/or environmental management.

Communication
A master of Environmental Sciences presents, reports and communicates the results and implications of environmental science research in national and international level, both independently as well as in a mono-disciplinary, multi- or interdisciplinary team of colleagues and/or non-colleagues and/or stakeholders.

Interdisciplinary researcher
A master of Environmental Sciences can interpret the position of Environmental Sciences with respect to other natural sciences. In addition, he/she has adequate knowledge of and insight into the organisational, legal and policy aspects of environmental issues as a result of which he/she, both independently and as a member of an interdisciplinary team, can contribute in a relevant and innovating fashion to the process of analysing and solving complex environmental issues.

Personal effectiveness - Learning process
A master of Environmental Sciences can independently and critically reflect upon his/her own individual actions, the resulting consequences and his/her position as a professional in society. He/she answers in that respect for the choices made and, in the professional context in which he/she operates, directs his/her personal development in terms of competences and the accompanying learning process.

Personal effectiveness - Reasoning
A master of Environmental Sciences can critically apply scientific and environmental methods of reasoning and can define a position with respect to a scientific line of reasoning that concerns his/her field.

Specialist
A master of Environmental Sciences integrates new knowledge and insights from various scientific sources of information, drawn up in English, with existing scientific knowledge and insights.

Structure of master programme

All of the faculties of the RU Nijmegen have implemented the bachelor-master structure. As the same structure is being implemented in most European countries, it is easier to adequately compare the academic institutes. The academic training Environmental Sciences consists of two components:

- Bachelor
- Master

The bachelor takes three years. The bachelor programme is broadly-based in Biology, Chemistry or Physics and has prepared you for the master training in Environmental Sciences. You havel received a bachelor's degree upon successfully completing the bachelor programme, with the title of 'Bachelor of Science' (BSc).
The master takes two years. During this phase, you will specialise in a certain field of study within environmental sciences. The master includes two traineeships. You will receive a master's degree upon successfully completing your studies, with the title of 'Master of Science' (MSc).

Clustering

The training courses within the Faculty of Science are clustered. As the courses within a single cluster work together, the interrelationships become clear. The clustering also aims to allow for a quick switch-over to a different training course within the same cluster. Environmental Sciences is part of the cluster of *Biosciences* (biology, medical biology and environmental sciences)

The Master

This is the period of two years during which you specialise in a certain area within Environmental Sciences. The Master programme consists of various components:

- Courses
- Environmental Science research traineeships
- Individual options

You will graduate in one of the following main orientations:

- Research (R-orientation)
- Management and Technology (MT-orientation)
- Communication (C-orientation)
- Education (E-orientation)
- Transnational ecosystem based Water Management (TWM)

Traineeships

Your master includes a number of traineeships, varying in duration from 6 to 9 months. Depending upon the orientation of your choice, you are to complete one or two environment specialisation and/or environment-related (research) traineeships.

- During the environment specialisation research traineeship,you are to conduct biological, physical or chemical research concerning an environmental issue.
- During your environment-related traineeship, you are to conduct research on the basis of an environmental question and you attempt to consider scientific research in a broader scope and to translate the research into aspects concerning nature conservation and environmental management.

Individual options
The master training includes individual options. You can use these options to gain more in-depth knowledge of certain environment-related subjects or environmental specialisations, but you may also opt to broaden your knowledge. You can do so by completing courses, by extending your traineeship or by completing an extra (profession-oriented) traineeship.

EC credits
EC credits are observed for both the Bachelor as well as the Master programme. This is the so-called European Credit Transfer System, an international credit system that expresses the scope of training courses. One academic year stands for 60 ec. A 40-hour working week corresponds to 1.5 ec. This means that a 6 ec module involves (on average) four 40-hour working weeks. The three-year Bachelor training is the equivalent of 180 ec (3 * 60). The two-year Master is the equivalent of 120 ec (2 * 60).

Organisation BioSciences

Educational institute and Research institutes
The Educational Institute of Biosciences is responsible for the course of events regarding the available courses of the academic educations that it provides.The university professors that contribute to the training courses can be found at both the various Research institutes of the Faculty of Science as well as at the nearby University Medical Centre St. Radboud.

There are two research institutes that are strongly attached to the Educational Institute of Biosciences and the master training Environmental Sciences, namely the IWWR (Institute for Wetland and Water Research) and ISIS (Institute for Science Innovation and Society).

The education department
This department consists of: the head of the Educational secretariat, the educational advisors, the training co-ordinator and the secretarial office. It is the responsibility of the Education department to co-ordinate the curriculum and to provide information on the academic training and recommendations concerning one's studies.

The department also has a supporting role where it concerns the policy of the Educational Institute, which is defined by the Director of the Educational Institute, the Collective Faculty Meeting and the training committee.

The director of the Biosciences cluster is Prof. Dr. J. van Zoelen. Each academic education within a cluster is headed by a co-ordinator. The co-ordinator of Environmental Sciences is Prof. Dr. Ir. A.J. Hendriks.

The staff members of the education department of Biosciences:
Ms. J.W.H. Smulders-Klabbers (Anneke)
Ms. E.M.A. de Laat (Elma)

Education department Biosciences
Room HG 00.114
tel.: 024 - 3653002
www.science.ru.nl

Ms. R.M.M. Delmee (Gina)
Ms. N.J. Ruitenbeek- Mohr (Nellemieke)
Department of Environmental Science
tel.: 024-3623281
www.science.ru.nl

Ms. H.W.J. Becks, MSc (Marlie)
Educational advisor master Environmental Sciences and bachelor Biology;
Secretary Committee of Exams for the master Environmental Sciences and bachelor Biology
024 – 3653285, m.becks@science.ru.nl

Ms.C.G.F. Mooren, MSc (Conny)
Educational advisor (Medical) Biology
Secretary Committee of Exams for the masters Biology and Medical Biology,
024 – 3652281, c.mooren@science.ru.nl

Mr. A. K.M. Rijken, MSc (Ton)
Head of the Education Department of BioSciences
024 – 3653282, akm.rijken@science.ru.nl

Center for Sustainable Management of Resources (CSMR)

The Center for Sustainable Management of Resources (CSMR) is an interdisciplinary department that focuses on the Beta-Gamma aspects of Sustainable Development, Water and Environment. The centre has three objectives; education, research and service to the society. You can find more information about our education program on:
www.studiegids.science.ru.nl/2007/science/prospectus/Interfacultaire_Milieuwetenschappen)

In addition, the CSMR ensures that the environmental expertise of the RU is adequately communicated to the government and the (international) business community. The CSMR also mediates in finding (inter-faculty) traineeships and supervisors.

Secretarial office CSMR:
ms A. Mooren, e-mail: a.mooren@science.ru.nl
Faculty of Science
Room HG.02.802
Co-ordinator of the CSMR: drs. P.J.M. van den Heuvel
T: 024-3652089
e-mail: p.heuvel@science.ru.nl

Information and Counselling

Academic guides
This Environmental Sciences prospectus contains all of the relevant information that was available at the time of its publication. This academic guide is available free of charge at the secretarial office of Biosciences (HG 00.114).

Rules of the game
A booklet on the rules of the game for students is published within the Biosciences cluster on a yearly basis. It contains all of the relevant information regarding the organisation of the studies in Biosciences, the registration for training courses and examinations, et cetera.

Information and Counselling
You may run into all kinds of problems during your studies as a result of which you may need advice or counselling. Problems concerning your enrolment, finances, preliminary exams and exams, the subjects of your choice, exemptions and applying for exams, et cetera.

The prospectus and other sources of information such as the instructors and the teaching assistants can answer many of these questions. However, you may be left with specific questions. If such is the case, you should not hesitate to call upon one of the educational advisors. In such cases, you would do best to set up an appointment with the educational advisor/training co-ordinator Marlie Becks. She is also available for specific questions concerning the progress of your studies (T: 024-3653285; e-mail m.becks@science.ru.nl). You can contact her on Mondays, Tuesdays and Thursdays. Depending upon the issue at hand, the educational advisor may opt to refer you to some other person or department:
- the student counsellor, when you have questions or problems concerning, for example, student grants, special facilities, et cetera.
- university doctor or university psychologist, in the event that the progress of your studies is being impeded by physical and/or psychological symptoms.

More information is available in the '*Vademecum'*. This is a handbook which you can get at the student affairs desk (T: 024-3616090). The handbook also includes the student statute, in which the rights and obligations of the student are described in detail.

Help from students' association
In addition to the academic guide and the educational advisor, your fellow students are of course the ideal walking encyclopedia. Many students are a member of Milieuprisma and the BeeVee. As a student of Environmental Sciences, you can join both.

Students' associations and organisations

Students' association: Milieuprisma
Milieuprisma is an association for and of environmental scientists in Nijmegen that was established in 1989. Milieuprisma is derived from the words 'milieu' (= environment in Dutch) and 'prisma' (= prism in Dutch), which in this case refers to the network of the environmental disciplines: social-scientific, policy-oriented and environmental sciences. Milieuprisma is active both at the Faculty of Science as well as at the Faculty of Management Sciences. The inter-faculty nature of our association stimulates the exchange of knowledge and offers something extra, as you learn to look beyond the boundaries of your own field. This association also aims to generate and strengthen social contacts.

Each year, Milieuprisma organises a weekend, various social gatherings, lectures, conferences, et cetera. The 'Prismagazine' is published around every two months. Besides being a regular member, you can also be an active member of Milieuprisma, which is not only fun but instructive as well.

In short, Milieuprisma offers you the opportunity to relax and to organise and participate in activities in addition to studying. You will find us in the canteen of the Faculty of Science and in the 'prisma room' at the faculty of management sciences. Feel free to drop by at the Prisma room for more information, call us or mail to:

Prisma room: Thomas van Aquinostraat 5.00.3
P.O. Box 9108
6500 HK Nijmegen
T: 024-3616107
E-mail: milieuprisma@fm.ru.nl
Internet address: www.ru.nl/milieuprisma

Students' association: The BeeVee
The Biologists' Association Nijmegen (BeeVee) is *the* students' association of bioscientists at the Radboud University. It was established on April 25, 1985. If you study biology, medical biology or environmental sciences, then the BeeVee is the perfect students' association for you! It is broadly-based and currently has approx. 350 members, offering something for everyone. Both for members who wish only to participate in the activities, as well as for members who want to actively dedicate themselves to one of the many committees that the BeeVee has. Incidentally, these committees always welcome new members with refreshing ideas. If this appeals to you, then visit www.beevee.nl. There you can read all about the committees. But the site also provides information on schedules,required reading lists and the like. And should you have ideas for improvements, then the website committee can always use a helping hand.

The executive committee of the BeeVee consists of 7 people, they run the association, ensure its continuity, see to daily odd jobs and guide the other committees. They try to be of service to every student. The aim of the association is to promote the interests of the student in the broadest sense of the word. For example, selling books at considerable discounts, social gatherings, parties, but also symposia, (cultural) excursions, sports and games. All in all, there is plenty to do with your spare time. If you have any questions, then please feel free to mail us: beevee@science.ru.nl or call: 024-3652537.
Room: HG 00.120 (12.45h-13.15h on working days)
A membership costs €5,- per year. If you become a member during your orientation week, you can opt to pay €20,- and to remain a BeeVee-member for the duration of your studies.

The Beta Career Fair Foundation
Students are more familiar with this foundation under the name BBB. The BBB organises activities for students of all of the various disciplines that make up the Faculty of Science and of course for affiliated disciplines as well. This organisation consists of students from these disciplines (should you be interested: we always consider reinforcements). The BBB organises a large-scale annual fair and a number of small-scaled activitites throughout the year.

The *BBB-Career Fair* helps master students and PhD-students upon venturing onto the job market and when applying for positions. The fair is held at the Faculty of Science each spring in the month of May. As numerous organisations are represented, all of which focus on part of our target group, the fair offers a great diversity of companies.

They present themselves by way of stands and lectures. You can speak with recruiters and collect information. What's more, senior students and master students can present their CVs online on the BBB website before, during and right after the fair. In this way, they stand a chance of being invited to the companies during the BBB-DiscussionDays. These are held a few weeks after the fair. They offer the opportunity for an introductory talk or a job interview. The chance of having the opportunity for a talk is generally higher in this case compared to applying for a vacancy or sending in an unsolicited application.

The fair is known for its informal atmosphere and the excellent service that is offered the visitors. For example, they receive the BBB-Career Book that contains descriptions of the companies. Moreover, the admission is free and they need not register beforehand.

BBB-WorkShops
Four workshops are organised prior to the fair. The themes vary each year, but they all provide the visitor with extra bagage for the job market. They may concern job interview training courses and case studies, but also subjects that are more light-hearted. The address of the organisation is:

Toernooiveld 1
T: 024-3652388
Internet address: www.bbb.science.ru.nl
E-mail: bbb@science.ru.nl.

Enrolment and books

Enrolment at the RU
The Central Students administration sees to the enrolment of all RU-students. Prior to the beginning of each academic year, every student who has enrolled receives a re-registration form. In order to receive your student card in time, it is best to return this completed form before July 15th. As it will be busy at the Desk, particularly at the beginning of the academic year, we recommend that you send in the re-registration form per post. Be sure to sign the registration form. Your enrolment is not valid otherwise. You will generally receive your student card an average of 6 weeks after having sent in the registration forms. More information regarding enrolmentis provided in the 'Vademecum'. The Handbook that contains also the Student statute. You can arrange for the discontinuation of your enrolment at the Examinations department following graduation.

Intake of students with a professional education in the master environmental sciences (ES)
Students with a professional education (in Dutch: HBO) and a scientific (e.g. (medical) biology, physics, chemistry) or environmental sciences background can be admitted to Environmental Sciences. There is no official transfer programme, but rather 'made-to-measure' transfer package is set up for the student.

You are to request the permission of the examination committee before you can transfer from your professional education to the master of Environmental Sciences. Depending upon your background, you may have to take a number of subjects from the last two years of the bachelor-programme of Environmental Sciences. Roughly, you will have to follow a 2-2.5 year programme (about 150 credits) after your BSc in a professional education before obtaining your master's degree in Environmental Sciences. The bachelor programme is in Dutch!!

In order to explore your possibilities, contact the educational advisor of Environmental Sciences, Marlie Becks (T: 024-3653285, e-mail: m.becks@science.ru.nl).

Registration for courses
You are to register for each module separately. You can register electronically via Blackboard up to not later than one month prior to the start of the module. When you register for a course you are automatically registered for the exam (not for a re-exam! See below)

Procedure registration of students from outside the RU
All university students that follow parts (modules, traineeships) of the Environmental Sciences programme are required to enrol at the RU so as to be officially registered. The student will then receive a student number of the RU. This is necessary in order to record the marks received for the parts followed. If the student is already registered at some other university, then he/she does not have to pay tuition fees a second time. The student is to register as a subsidiary student.

The student has to apply at the Office of Student Affairs, Comeniuslaan 4; T: 024-3612345. The Office of Student Affairs will then send the student a registration form that is to be completed and returned as soon as possible. Upon enrolment after October 1st and before May 1st, the student must also send in a form that includes a statement from the training co-ordinator of ES to confirm that the student has permission to follow part of the programme. This form is to be sent in along with the registration forms. You cannot enrol in the current academic year after May 1st. If problems occur, then you can contact the educational secretariat of Bio-sciences.

Faculty students administration
The Faculty Students administration (FSA) is located on the ground floor, room HG 00.134.

Staff members:
Ms. Y.E.P.M.M. Mulder-Nijs
Ms. C.M.A. Hendriks
Opening hours for students:
Monday through Thursday from 13.00h - 16.00h
Friday from 09.00h - 12.00h

You are to report the following to the FSA/Examinations department as soon as possible:
- change of address (both study address and holiday address)
- termination or interruption of your studies
- a change in branch of studies
- confirmation of an extension of your registration period.

Registration re-exams
You are to register electronically via KISS for each re-exam.
If you have not registered for a re- exam, then you will not be allowed to take part. Registration is to take place not later than 5 working days before the date of the re- exam. If you have problems with the electronic registration, then you can contact the secretarial office of the Faculty Students administration.

KISS (RU Internet Students Service)
KISS includes a range of Internet services for students at the RU. Every RU-student has access to KISS. Among other things, KISS allows you to view your own preliminary exam results, to register for study groups and preliminary exams, to change your address, receive and send e-mail, to create your own webpage and to gain access to the Internet by phoning in. In addition, the monthly newsletter is also sent to all RU students through KISS. It states all kinds of important news items that concern the RU. You will receive information on your KISS-account together with a personal inlog code at the beginning of your first year. You are to change this inlog code into a password the first time that you log in. If you lose your password, then you can request a new one at the Student Affairs Desk upon presenting your student card. You will find the KISS-programme on the Internet via www.student.ru.nl. If you wish to access the Internet through the RU, then you can collect the CD-Rom Surfkit at the Desk for the installation of your dial-up connection. Contact the Desk if you have any questions or problems concerning your KISS-account. You can also send an e-mail to: helpdesk@student.ru.nl.

Logins and e-mail addresses
Two logins apply:
- a faculty science.ru.nl-login, for access to Faculty of Science computers, such as terminal rooms, STAP work stations, login-server studs, @science.ru.nl mail and the Faculty of Science dial-up service.
- a university student.ru.nl-login, for access to KISS with @student.ru.nl mail and the RU dial-up service

Do you have any questions or problems?

Contact the helpdesk / Student Affairs Desk for questions concerning KISS and the student.ru.nl e-mail address.
Contact C&CZ Systems Management for questions concerning the computers at the Faculty of Science and the science.ru.nl e-mail address. You can also send a mail to them: postmaster@science.ru.nl.

Purchasing books
Master students don't need many books. Most courses have all the information you need on Blackboard.
Students can order books via the BeeVee. This is the students' association for the students of Biosciences. The BeeVee distributes order forms during lectures. You can indicate on this form whether you wish to order books through the association. You are to make a down payment in the amount of €25,- for each book that you order. You can collect the books that you order at the BeeVee-room (HG 00.120, working days between 12.45h and 13.15h). Contact the BeeVee-room if you have any questions.

The job market
Upon completing your education, you will qualify for various positions on the job market. The area of specialisation as part of your academic education, the subjects that you choose and the orientation of your choice (research, communication, education, or management and technology) all strongly determine the tasks involved in your future position. The job market and the support offered upon venturing upon this market are discussed below.

Job market
The educational institute of Biosciences has detailed information at its disposal concerning the careers of its graduates. Surveys of the graduates are held on a regular basis. One of the aspects of these surveys concerns the employers where the graduates have found a position.
A survey (dated March 2006) of the graduates from the period 2000-2005 shows that 97 percent of the graduates hold paying positions.

The graduates from the period 2000-2005 are employed by consultancies (38%), university institutions (13%), research institutions (13%), the business community / industry (13%), the national government (8%)and Water Board (8%). Furthermore approx. 8 % of the graduates works at provincial or local authorities and cooperative body of municipalities.

Relevant positions include advisor, project staff member, research assistant (AIO) / trainee research worker (OIO), researcher, policy staff member or project manager. All in all, 42 percent of the positions are oriented towards environmental management (including soil management, environmental impact assessment, quality protection, health and safety and environmental protection), 25 percent is oriented towards water management (including safety and urban water management).

Approx. 12 percent hold positions that concern nature conservation and approx. 12 percent hold positions that involve a combination of environmental/water management and nature conservation. The remaining graduates (8%) fulfil positions that are not exclusively oriented towards the environment. There are scarcely any graduates who move on to areas that are not 'environment-related', such as the Information and Communication technology (ICT) sector. You can find information on the positions held by graduates in the 'Who's who' guide of the department. The who's who guide is available at the alumni department of the RU Nijmegen, Comeniuslaan 6.

Support upon entering the job market
Whether or not you find a suitable position will largely depend upon your own initiatives. There is a vacancy notice board in the hall outside the department of Environmental Science . Here you will find vacancies for environmental scientists. The department is often notified of vacancies that are then sent on to suitable candidates. The Environmental Sciences institute plays an active role in finding suitable positions. Studies show that approx. 20 percent of the graduates have found a job through the mediation on the part of a staff member of the institute. There are also other agencies that can help you on your way. Of course, you can always visit the regional employment office. In some cases, they can advise or guide you in finding work. In addition, there are also a number of temporary employment agencies that mainly focus on positions within the environmental sector.
The university also undertakes activities in this respect. For example, the Information Centre for Student Affairs of the university regularly organises training courses for job applications / interviews. Contact the centre for additional information (T:024- 3612345).

The Department of Environmental Science is extremely interested in the experiences of its former students on the job market. We would therefore be very appreciative if you would keep us informed of any changes of address and of the position that you hold once you have completed your studies. This will enable us to have the academic training link up with the job market as much as possible and to adequately inform new students on the situation of graduates on the job market.

Former students' association
The former students' association of Environmental Sciences was set up in the course of 1997. The alumni department of the RU sees to the administration, the co-ordination and offers activities and facilities. The former students' association usually organises an activity once every year. Students are also welcome to participate. The association, in co-operation with Environmental Sciences, is considering organising training courses and creating traineeship posts for present students. The first who's who guide with information on graduates and their field of work was published in September 1999.

1.3 Organisational structure RU-Faculty of Science

Organisation RU - Faculty of Science

Organisation RU
The Radboud University Nijmegen is not a government institution, but rather an organisation for education and research in the form of a foundation. The administration of the foundation is formally the highest governing body. The tasks in the sphere of academic training and research are carried out in the faculty. The Faculty of Science (FS) is one of the 8 faculties that make up the university of Nijmegen.

Organisation Faculty of Science
The faculty offers the following master programmes: biology, medical biology, environmental sciences, physics and astronomy, chemistry, mathematics, information technology, information science, bio-information technology, cognitive neuro-science, natural sciences, nanoscience & technology, and molecular life sciences. Most of the academic programmes are classified in one of the following 4 clusters.
- Cluster Information technology, Information science, Bio-information technology
- Cluster Biology, Medical Biology and Environmental Sciences
- Cluster Chemistry, Natural Sciences, Molecular Life Sciences
- Cluster Physics and Astronomy, Mathematics

The faculty is led by the chairman of the faculty. He/she is assisted by two vice-chairmans. The faculty administration is made up of the chairman of the faculty, the two vice-chairmans and a student assessor.
The Faculty of Science has a division comittee (DC) in which 15 staff members serve and a Faculty Student Counsel (FSC) in which 6 students serve. The DC and the FSC consult with one another in the Faculty Collective Meeting.

Office of Student Affairs
Do you have questions concerning your enrolment at the university or is the progress of your studies in a deadlock? Would you like to know more about the regulations of student grants or are you looking for cultural student activities? The staff at the Office of Student Affairs can help you on your way in the sphere of students' administration, students' counselling and cultural activities. The central student facilities of the Office of Student Affairs are discussed below per theme.

The central access to the Office of Student Affairs is the Desk. Here, you can obtain information concerning the student counsellors, the university psychologists and the Studies and Career Advisory Group. In addition, you can set up an appointment with a student counsellor or university psychologist or register for a studying skills course.

The desk is furthermore for the purpose of answering your questions concerning your enrolment/deregistration at the RU, for information on and applying to the Graduation fund or Emergency fund, for reporting a delay in your studies due to exceptional circumstances, for basic information on student grants, for registering for your examination through the Examination department of the A-Faculties and for various pamphlets, forms and brochures. The KISS-Helpdesk can be found at the Student Affairs Desk as well.

The Desk is open daily from 10:00h to 17:00h, with the exception of the first Friday afternoon of each month. The address of the Desk is Comeniuslaan 4 on campus. The staff of the Desk can be reached per telephone from 8:30h to 12:30h and from 13:30h to 17:00h via tel. 024-3612345. You can also mail your questions via address balie@dsz.ru.nl. You can furthermore find Student Affairs on the Internet via www.ru.nl/studentenzaken.

Student counsellors
The student counsellors can help you with questions concerning laws and regulations. The counsellors provide advise in the event of problems with, for example, your finances, illness, the discontinuation of your studies, problems with student grants, your housing situation or because you feel unjustly treated with respect to a preliminary exam or other exam. A delay in your studies is to be reported to the student counsellor as well. A student counsellor furthermore acts as the permanent contact for top-class sportsmen and -women that are enrolled at the RU. The various student counsellors each have their own specialism, for example for students with a functional disorder or a foreign preparatory training.
The counsellors are required to observe confidentiality towards third parties.
You can set up an appointment with a student counsellor at the Desk. In addition, you can speak with a counsellor per telephone on working days from 9:00h until 10:00h and from 16:00h until 17:00h via tel. 024-3612345.

University psychologists
You can see the university psychologists for problems concerning your studies. If, for example, you have problems with your concentration or you suffer from anxiety before exams, then it may help to set up an appointment with a university psychologist. You can also call upon one of the psychologists to discuss any other personal problems that impede your studies, such as depression or social insecurity. You need not be in deep trouble before setting up an appointment with a university psychologist. The psychologists are also available for personal issues that may seem relatively simple.

Following an initial interview, individual or group therapy is available. In some cases, the psychologist may refer you to some other therapist or institution.The initial interview alone may prove sufficient for information, advice or mediation. You can set up an appointment with the university psychologist via the Desk. In addition, you can speak with a psychologist on working days from 8:30h until 9:00h and from 12:00h until 12:30h per telephone via tel. 024-3612345.

Confidant and Complaint committee Inappropriate Behaviour
Two university psychologists act as confidant for students regarding Inappropriate Behaviour. You can call upon them in the event that you experience sexual intimidation, discrimination, aggression and violence, pestering and tormenting. You may decide whether you wish to speak with a female or male confidant. You can set up an appointment with a confidant at the Desk. If the intervention on the part of the confidant offers no solution, then you can file a complaint with the university Complaint Committee. You may opt to do so right away as well.

Complaints are to be filed in writing within two years after the inappropriate behaviour took place. This term does no apply if the behaviour involves a punishable act. The Complaint Committee, in which a student has a seat as well, will examine the complaint and will hear both the complainant as well as the accused. The inquiry will be completed within six weeks after receiving the official complaint. The committee will report to the Board of Governors within two weeks at most and will recommend measures, if any. The Complaint regulation is included in the Student statute as appendix 9 of the *'Vademecum'*. A pamphlet with additional information is available at the Info-theque Student Affairs and the Confidant.

The address for formal complaints is: Secretary Complaint Committee Inappropriate Behaviour RU, P.O. Box 9102, 6500 HC Nijmegen. You are to state 'personal' on the envelope.

The 'SLAG': Studies and 'Loopbaan' (=Career) Advisory Group
You can call upon the staff of the SLAG for questions, advice and counselling concerning your studies and career. The Info-theque, the trainers, the study/careers advisors and the Service centre for the Higher Educated work closely together in the SLAG so as to advise and assist you as much as possible.

Info-theque
The Info-theque offers all kinds of information and documentation on the academic educations inside and outside the RU, on the job market and on studying and doing traineeships abroad. The Info-theque also has excellent computer facilities for the purpose of finding information (using special search engines, if desired) on the Internet. The Info-theque is open on working days from 11:00h to 17:00h. You can also reach the staff of the Info-theque per telephone: 024-3612975 or via e-mail address infotheek@dsz.ru.nl.

Study/careers advisor
If you have doubts concerning your current studies or if you are considering discontinuing your academic education, then you may consider alternatives by means of an exploratory study that is conducted by the study/careers advisor. You can examine your possibilities based on your preliminary education or the subjects that you have chosen and/or where your interests lie. You can also consult with the advisor if you cannot choose between two academic educations or if you doubt that a certain alternative is feasible. What's more, you can consult with the advisor for questions regarding your choice of subsidiary subjects, preparing for the job market, re-education or extra training or a post-university/professional education. It is possible to do a careers advice test. The test consists of a number of components and a discussion with the study/careers advisor. Besides on an individual basis, you can also participate in an introductory course studies/career choice.The careers advice test and the introductory course each cost 10,-. Information and registration at the Student Affairs Desk.

Service centre Job market for Higher Educated
The Service centre Job market Higher Educated is concerned with students who have almost completed their studies or who have just graduated. The activities of the Service centre prepare you early on for what you can expect following your study and they stimulate that your study link up well with the job market. The Service centre has information on employers and vacancies, on selection procedures and on recruitment and selection. You can visit the Service centre without an appointment on Monday, Tuesday and Thursday afternoons from 13:30h until17:00h. The staff of the Service centre can be reached per telephone via tel. 024-3615804 or via e-mail address loopbaan@dsz.ru.nl.

Studying skills training courses
The trainers of the Office of Student Affairs give courses and training in the sphere of studying skills, social skills and professional skills. Examples include a course in writing a thesis or a job interview training course,but also training in giving presentations or a self-management course. All of the courses are described briefly in the Vademecum. A survey of the dates upon which the courses have been planned is available at the Desk. Pre-notifications can often be found in VOX. Some courses require that you set up an appointment beforehand.You can register for a course at the Student Affairs Desk.

External Relations

The External Relations department advises and supports the Board of Governors and the faculties where it concerns developing and maintaining the external relationships of the RU. Students can call upon the External Relations department for questions concerning:
- studying abroad and the grants that are available to that end: see Studying abroad
- conducting research in connection with traineeship/thesis: see Research & Society
- keeping in contact with the university and fellow students *after graduation*: see Alumni

Studying abroad
More and more students come to the conclusion that studying abroad for a while is very worthwhile. This is not only true if you come across subjects during your studies that are not offered in the Netherlands. Studies have shown that a period of studying abroad can be very significant for one's personal development, studies and perspective.
The possibilities of studying abroad are almost unlimited. There are all kinds of national and international programmes that render a stay abroad possible and there are many types of grants and funds with which to finance a period of studying or a traineeship abroad.
More information? Visit our website www.ru.nl/er under *Internationalisation*. Of course, you can always call or drop by as well.

Visiting address: Comeniuslaan 4
Correspondence address: P.O. Box 9102, 6500 HC Nijmegen
T: 024 - 3616055
e-mail: int.relations@er.ru.nl
Opening hours: on working days from 10.00h until 17.00h.

Research & Society
The university maintains contacts with all kinds of social organisations and the (local) authorities in the Netherlands. These include, for example, knowledge centres for multicultural issues, Provincial States or environmental advisory bodies. These and other organisations regularly approach the university with social issues. Students can conduct scientific research for

organisations of this kind as part of their final project. In addition, External Relations is always looking out for interesting social themes and research questions in this respect. This because the university finds it important to share the knowledge that is available at the university *and* to test this knowledge in actual practice.
Visit our website for more information www.ru.nl/er under *Transfer of knowledge*.
Opening hours: on working days from 10.00h until 17.00.

Alumni
Graduated? The university would very much like to keep in touch with you. There are different ways in which to achieve this. For example, you can become a member of the former students' association, make use of the network facilities and be allowed discount facilities. A good way to keep in contact with former fellow students, to make new contacts and to exchange experiences.
Visit our website if you want more information www.ru.nl/er under *Alumni issues*.

Study facilities

The library
The library of the Faculty of Science is located on the ground floor of the new building. The opening hours are Monday through Friday from 9.00h until 17.30h. The library is accessible to everyone. A lending pass is mandatory. Students can collect a lending pass free of charge at the lending counter of the Central University Library: Address: Erasmuslaan 36, Nijmegen.Internet: www.ru.nl/ubn
Opening hours Monday through Thursday: from 8.30h until 22.00h (applications until 17.00h; lending department and information desk closed after 17.30h). Friday: from 8.30h until 20.00h (applications until 17.00h; lending department and information desk closed after 17.30h). Saturday: from 9.00h until 17.00h (lending books is possible: lending department is open; information desk is closed).

Terminal rooms and STAP-work stations
C&CZ manages a number of work stations for the Faculty of Science that, in principle, can be used by anyone with a login. The latest information is available on the following site: www.cncz.science.ru.nl/ned

UCI
The University Centre of Information (UCI) offers a variety of computer facilities for students. There are computer courses that you can take at a reduced rate. Moreover, the centre sells inexpensive software packages and can provide documentation on various subjects in the sphere of computers. The UCI can also advise you when you purchase a computer. The latest information and the services offered by the UCI can be found on the UCI website.

UCI
Geert Grooteplein 41
Opening hours: Monday through Friday: 9.00h - 13.00h and 13.30h - 17.00h.
tel. 024 - 361 79 39
e-mail info@uci.ru.nl
Internet: www.uci.ru.nl

Emergency fund
The Emergency fund can be of help to RU-students by means of providing an interest-free loan in the event of financially difficult situations. These are to be of an incidental nature: that is to say that the situation may not concern structural (permanent) problems with your (student) grants. You can request a loan directly at the Student Affairs Desk.

Financial support in the event of a delay in your studies due to special circumstances
If special circumstances cause a delay in your studies and, as a result, you face problems with your student grants, then you may qualify for financial support. These special circumstances are understood to mean, among other things, illness, special family circumstances, a functional disorder, the set-up of your studies or being involved in top-class sports. You are to report these circumstances at the Student Affairs Desk within three months. It is required in this respect that you consult with your educational advisor - in connection with the planning and, if required, supervision of your studies - *and* with a student counsellor. You are to state the agreements to that end on a report form that can be obtained at the Desk. After the academic year, you will receive a registration form with which to record the delay in your studies. You are to send it back together with the items of evidence and a statement from the educationaladvisor. Afterwards, you will recieve an order from the Board of Governors that entitles you to a number of months of financing from the fund. You can request these funds as soon as you have spent all of your student grants and have yet to graduate. You will then receive a benefit from the graduation fund for this number of months. A application form to that end is available at the desk.
The regulation Financial Support Students is included in its entirety as an appendix to the student statute (included in the Vademecum).

Financial support in the event of a delay due to management activities
RU-students who fulfil administrative positions in faculty boards, committees or student associations are entitled to a number of months of financial support from the Graduation fund. The purpose of this support is to enable the student to graduate if his/her studies have been delayed due to managerial activities. As of September 2002, this financial support is paid out during the administrative year and is no longer dependent of whether or not there is actually a delay in one's studies. The regulation Financial Support Students is included in its entirety as an appendix to the student statute (included in the Vademecum). You can also call upon the student counsellor for information and advice.

Vademecum and the Student Statute for RU-students
The Vademecum is the Handbook for the students of the RU. It includes general information on housing, living, welfare, student grants, studying, rights and obligations of students, services provided, associations and organisations for students. The regulation Financial Support Students (for example, in the event of a delay in your studies due to management activities)is included in its entirety in the Vademecum. What's more, it conveniently includes relevant addresses and telephone numbers.
The student statute is also incorporated into the Vademecum. It is made up of a description of the rights and obligations of all of the students who are registered at the RU that are the result of legal and university regulations.
The Vademecum is available free of charge at the Student Affairs Desk, all lecture notes centres and the Advisory centre for Language and Literature. The text is also provided on the Internet: www.ru.nl/studentenzaken/vade.html

Exams

Master's examination
In order to make an application for the master's examination, you are required to present the following documents at the Faculty Students Administration/Examination department (FSA) (room HG 00.134):

- Valid student card
- Bachelor's degree (original + copy)
- A excerpt from the register of births, deaths and marriages or the municipal register or the register of births (this applies only to the students who completed their foundation course elsewhere)
- The approved combination of subjects must be present at the Examination department/ Students administration.
  NOTE!: this combination must be handed in not later than 3 months prior to applying for the master's examination in connection with the assessment by the examining board.
- (If applicable:) an external candidate statement. It is to be handed in upon applying for the master's examination.

It is required that you were registered as a student or as an institute student (this is a student who is not entitled to student grants) during the academic year (or academic years) during which you participated in practical lessons. The same applies to thesis/traineeship supervision. First you have to ask to apply for the master's examination at the faculty of Science. You should do that not later then 14 days *prior* to the date of the examination (this is the date upon which the exam is to be held). Upon applying, all of your marks must already be processed in ISIS/KISS. Other arrangements have been made for the final exam date of the year (namely 31-8-2007). You are to register for this exam not later than **May 30, 2008**. Some of your marks may not be known at that time. The last mark must be reported to the Students administration (during opening hours) not later than **August 28, 2008**.

After you have made your application for your master exam at the Faculty of Science you will get a letter with a declaration of the Committee of Exams that you may apply for the exam. With this letter you have to go to the the University Bureau of Exams at the Comeniuslaan 4 (Opening hours: 10.00h- 12.00h daily) to compleet your application. They check several things for example if you were subscribed as a student etc. Because of these checks the Bureau of Exams needs about 30 days to prepare your master certificate.

The master's examination is held 11 times per year. This is always on the last Wednesday of the month (with the exception of the month of August and if the last Wednesday is a day off, in which case the exam will be held one week earlier). The 'holding of the examination' is mainly an administrative affair: verifying that you have met all of the requirements and whether or not you took all of your subjects that are stated as the subjects that you have chosen.
The presentation of the master's degree takes place several times per year. The dates that correspond to the academic year of 2007-2008 are: **November 27, 2007, January 29, 2008, March 25, 2008, May 27, 2008, August 26, 2008 and October 28, 2008.**

During the Master you are to submit your subjects to the examining board of Environmental Sciences. This combination of subjects makes up the subjects and research traineeships that you intend to complete during the Master programme in order to meet the minimum requirements to graduate. You can request an application form at the educational secretariat. You are to submit

your choice of subjects to this secretariat as well, addressed to the examining board of ES. You are also to include a brief explanation of the nature of your research traineeships. You can have this explanation approved beforehand by one of the contacts of the education programme by means of a signature.

The examining board assesses your combination of subjects in terms of gravity and content and also considers the coherence. So as not to be disappointed, it is therefore advisable that you timely request the approval of the subjects that you wish to choose. Your initial choice is not binding for the duration of your studies. If you prefer to choose some other subject(s) during your studies, then you simply need to present your new combination to the examining board. In order to graduate, you must comply with the requirements pertaining to your most recently approved combination of subjects.

Right of complaint

It is laid down in the faculty regulations that you have the right as a student to file a complaint in writing, either individually or as a group, with the faculty administration. This refers to complaints that concern the manner in which the university observes its obligations towards students.

In the event that you disagree with the results of a preliminary exam, or if you feel you were treated unfairly, then you would do best to contact the university teacher concerned or the educational advisor. In addition, you can also call upon the examining board of your study programme. If there remains an insuperable difference of opinion, then your final option is to lodge an appeal against the decision concerned (an exam result) or the treatment concerned. The decision / treatment must be either in contravention of the Educational/Examination regulations, or in contravention of the principles of reasonableness and fairness. An appeal of this kind is to be filed in writing within 30 days after the decision has been made or the treatment took place. The student counsellors of the Office of Student Affairs can help you draw up a notice of appeal. In the event that the appeal is found to be admissible by the Board of Appeal for Examinations, then any possible solutions or a compromise will be considered. If such proves not to be possible, then the Board of Appeal, after hearing both parties, will ultimately come to a decision.

Address:
Board of Appeal for Examinations
Comeniuslaan 4
P.O. Box 9102
6500 HC Nijmegen
T:024-3615700

Collective right of complaint
The collective right of complaint concerns complaints that have to do with the manner in which the university observes its obligations towards students. Students can call upon the faculty student counsellor for complaints of this kind. The complaint is to be filed within 3 months following the facts concerned and is to be supported by at least five students. The student counsellor will form an opinion within one month, unless the decision-making process requires more time. In that case, he will inform the students concerned of when they can expect a decision.

Quality Care

The RU attaches great value to the quality of the education that it provides. Both the academic programmes as well as the students are expected to make various efforts in order to achieve the best possible result. Concerning the academic programmes, the quality care is both internal and external.

The internal quality care is aimed at the entire range of activities for the purpose of maintaining and improving the quality of the training within a faculty or academic programme.
All higher educational institutes are required to be officially recognised. The external quality care provides a final assessment to that end; a quality mark is ascribed to a training programme. This quality mark is a precondition for the funding of the programme, student grants and loans, the recognition of the diploma's and the granting of degrees.Training programmes are independently assessed and there is a strong emphasis on product quality (the level achieved by graduates) and on internal quality.

The faculty education committee, on behalf of the faculty administration, co-ordinates the process of quality control and quality improvement on the faculty level. The programme committee plays a key role in this respect on the level of the training programme. This committee examines whether the quality level of the organisation, co-ordination, execution and programming of the academic training and the counselling and tutoring is sufficient. The programme committee also considers any improvement measures that are to be taken. This committee provides solicited and unsolicited advice to the faculty administration, the training director, the co-ordinator and the module co-ordinators concerning the execution and the programming of the academic training. Students make up half of the programme committee, and so the students are very involved in the process of quality care.

An important tool with which to monitor the quality of the academic programmes concerns the surveys with respect to the courses and research traineeships and the verbal evaluations of the couses. The survey allows you to air your opinion of the training anonymously. Each course (or module) co-ordinator is required by the training committee to annually evaluate his/her module using standard questionnaires. For organisational reasons, these questionnaires are distributed immediately after the preliminary exam. The co-ordinator draws up a report on the findings (in accordance with a standardformat) and also indicates the performance figures. Options for improvements and when these are to be scheduled are to be stated for the bottlenecks that become evident. The research traineeships are evaluated using standard forms as well. The questionnaire concerning these traineeships is distributed by the supervisor on completing the traineeships,as soon as the report has been discussed. The training co-ordinator collects these completed questionnaires and draws up a report on the results. All of these reports are public and can be examined at the secretary of the programme committee. The programme committee discusses these reports, consults with the programme management or the teachers concerned if necessary and checks that the proposed plans for improvements are actually carried through.

2 The master programme

2.1 Main orientations

You can choose between the following main orientations (variants) during your master's programme:

- *The research orientation (R)* is intended for those who wish to conduct fundamental or application-oriented research at a university, company or research institute. There are various fields of research from which to choose. You will acquire knowledge, insight and practical skills and you will master a scientific way of thinking. You will then be capable of generating solutions to problems in the sphere of environmental sciences in a manner that is inventive and scientific, as well as socially sound.

- *The management and Technology orientation (M&T)* will appeal to those who wish to fill a policy-related, management or commercial position with a scientific background. The MT-subjects provide insight into the managerial and administrative perspective on social and organisational problems and the concepts, models and instruments that are used by companies (profit and non-profit) and the authorities to tackle these problems in practice. You learn to consider your knowledge of the scientific backgrounds of current issues within the broader framework of the development of a company, the economy and society.

- *The communicative orientation (C)* trains students to fulfil academic positions in the sphere of the communication of science (research, application, media). If you graduate in this orientation, then you will be a bèta+ who has acquired supplementary theoretical insights and communicative skills that broaden your own field (bèta-gamma-integration). You will gain insight into the communication with respect to innovation processes and processes of change, as well as insight into the use of (mass) media and popularisation.

- *The educational orientation (E)* provides you with the starting competence to adequately carry out the key tasks of a teacher on the one hand and the capacity to develop yourself further as a fully qualified teacher on the other. Within the E-orientation, you will acquire competences in the sphere of six teacher roles, namely: the teacher in the classroom, the specialist in his/her field, the educationalist, the reflecting professional, the teacher outside the classroom and finally the developer and researcher.

- *The specialisation Transnational ecosystem based Water Management (TWM)*. In this new programme, rivers are considered valuable natural systems. By means of a step-by-step plan (retain, store, drain), managers can determine what limits there are in the spatial planning of a river basin and where they are found. Flooding risks can be reduced by restoring river systems to their natural state. This new approach requires other management techniques and public involvement. Therefore, it is essential that future water managers gain a thorough understanding of sociology, law and management in addition to such obvious disciplines as ecology, hydrology and engineering. The two-year programme is a joint initiative of the university of Duisburg-Essen (Germany) and Radboud University Nijmegen (Netherlands). TWM students will graduate at both universities and TWM prepares students for an international career in water management.

The orientations of the master

Research orientation
- Mandatory subjects environmental sciences (20 ec: Environmental Sciences, Environmental & Ecological modelling, Integrated Environmental Assessment, Orientation in Environmental Research and Management)
- Optional courses (9 ec)
- Philosophy (3 ec)
- Two environmental science research traineeships (minimum of 30 ec)
- Research Skills (3 ec)
- Final assignment (4 ec).
- Free space (21 ec):
  - extension of a (external) environmental science research traineeship up to 45 ec
  - a (career-oriented) traineeship of 15 ec
  - other exam components

M&T-orientation
- Mandatory subjects environmetal sciences (15 ec: Environmental Sciences, Environmental & Ecological modelling, Integrated Environmental Assessment)
- Philosophy (3 ec)
- One environmental research traineeship (30 ec)
- Mandatory basic courses (5*5=25 ec)
  - Business & Society
  - Organizations Science
  - Innovation Management
  - StrategyMarketing
  - Finance & Accounting
- M&T- optional course(s; 5 ec): Science & entrepreneurship (3 ec), Research Strategy & Management 3 ec), Industriele fijnchemie (Dutch; 3 ec), Algemene managementvaardigheden (Dutch: 2 ec) or an other course.
- Final project (27 ec)
- Free space (15 ec) (See R-orientation)

C-orientation
- Mandatory subjects Environmental Sciences (15 ec: Environmental Sciences, Environmental & Ecological modelling, Integrated Environmental Assessment)
- Philosophy (3 ec)
- One environmental research traineeship (30 ec)
- Mandatory basic courses (7*3=21 ec)
  - Introduction Science Communication (3 ec)
  - Science and Societal Interaction 3 ec)
  - Risk Communication 3 ec)
  - Boundary Work 3 ec)
  - Framing Knowledge 3 ec)
  - Knowledge Society 3 ec)
  - Science, Media and Strategy 3 ec)
- Optional courses of 6 ec
- Final project (30 ec); in the area between (Nature)Science and Community
- Free space (15 ec) (See R-orientation)

E-orientation (E-variant; parts lectured in Dutch)
- Verplichte vakken (15 ec: Environmental Sciences, Environmental & Ecological modelling, Integrated Environmental Assessment)
- Filosofie (3 ec)
- Een milieuwetenschappelijk onderzoeksstage (30 ec)
- Begeleide stage en betaalde stage (samen 57 ec. Deze stages zijn integrale leertrajecten, waarin een continue wisselwerking van theorie, praktijk, intervisie en supervisie plaatsvindt).
- Vrije ruimte (15 ec) (Voor invulling: zie O-variant / R-orientation)

TWM-specialisation
- Mandatory subjects (57 ec; Environmental Sciences, Environmental & Ecological modelling, Integrated Environmental Assessment, Orientation in Environmental Research and Management and the courses lectured in Germany see 4.3)
- Philosophy (3 ec)
- Free space (6 ec)
- Optional courses (8 ec)
- Project (16 ec)
- Master thesis (30 ec)

More information on the contents of the courses of the M&T orientation are available on the website: www.studiegids.science.ru.nl/2007/mt and the same applies for the C-orientation on the website: www.studiegids.science.ru.nl/2007/communicatie
Information about the schedules of the courses you can find on the website of BioSciences: www.biowetenschappen.science.ru.nl

2.2 Schedule Master's programme

The Master's programme is shown below in a diagram form for the various main orientations and the combination.

O	MT	C	E	TWM
mandatory subjects (20) optional subjects (9)	mandatory subjects (15) free space (15)	mandatory subjects (15) free space (15)	mandatory subjects (15) free space (15)	mandatory subjects (57; courses lectured in Nijmegen ....
traineeship (30)	traineeship (30)	traineeship (30)	traineeship (30)	and Duisburg) philosophy (3)
free space (21) philosophy (3) Research skills (3)	optional course MT (5) mandatory courses MT (25)	mandatory subjects C (21) optional courses C (6) philosophy (3)	supervised traineeship and	project (16) optional courses (8) free space (6)
traineeship (30) Final Assignment (4)	final project (27) philosophy (3)	final project + reporting (30)	paid traineeship (together 57) philosophy (3)	Master thesis (30)

The schedules of the courses can be found in full on the website of BioSciences (www.ru.nl/biowetenschappen/onderwijs/roosters). It is possible that there are some last-minute changes, for instance in the lecture-rooms. Usually these changes are passed on via Blackboard, or e-mailed to your @student.science.ru.nl address, so check your email!

2.3 Traineeship Environmental Sciences in general

The master programme starts with several courses. Upon completing these, you will proceed to conduct research in environmental sciences.
Most of the research traineeships take place at the departments of the Faculty of Science or the Faculty of Medical Science. It is also possible to do a research traineeship elsewhere. External traineeships often concern research institutions, organisations or companies (for example, RIVM, Alterra, consultancies, KEMA, ANDENO) with which the departments of the Faculty of Science maintain contacts.

In addition to a daily supervisor during the external traineeship, the student will also be appointed a supervisor at the faculty for the purpose of monitoring the progress and quality of the research traineeship. External traineeships often go hand in hand with separate traineeship agreements in which certain arrangements are made concerning supervision, responsibilities, products and traineeship allowances.

If you find it difficult to choose, then you can opt to set up an appointment with the educational advisor in order to discuss matters. You can also call upon the contact persons of the various departments for additional information concerning the research traineeships that they offer. It is important that you realise that the subjects mentioned are not exhaustive. It is often possible to propose a subject of your own, provided that it is in line with the research that is conducted at the department concerned.

The majority of the departments requires that you apply for a research traineeship at least 1 month before and no earlier than six months before the start of the traineeship. You can register for a traineeship at the secretarial office of the department concerned or through one of the permanent staff members of the department.

2.4 Optional courses

The Master programme also offers the opportunity to take optional courses. These courses may be part of the curriculum of other related disciplines and/or parts of other programmes of an environment-scientific nature. If desired, you can also take courses at the University of Wageningen (WUR) or the Open University (OUNL). In addition, you may take courses that make up part of one of the other orientations. Some courses may make up part of various orientations. Other courses are lectured only once in two years. You are to work out the scheduling of these optional courses on your own. Some courses are only lectured in Dutch. For capita Biology see the prospectus of the master Biology and Medical Biology.
For courses of the CSMR see
www.studiegids.science.ru.nl/2007/science/prospectus/Interfacultaire_Milieuwetenschappen

Below you will find an example of the possibilities:

Research orientation
- GIS 2 (6 ec; FNWI)
- Estuariene Oecologie (3 ec; Biology. FNWI)
- Milieuperceptie en gezondheid (6 ec; FMW; zie ook site of CSMR)

- Capita Biologie (3 ec; Biology, FNWI)
- Ecology and management of large rivers (3 ec; Biology, FNWI)
- Adaptatiefysiologie (6 ec; Biology, FNWI)
- (Arbeids)milieu en gezondheid: de rol van perceptie en communicatie (6 ec; CSMR)
- Gender Aspects of Integrated Water and Natural Resources Management (3 ec; CSMR)
- Arbeidstoxicologie en milieuzorg (6 ec; FMW)
- Chemische mutagenese en carcinogenese (6 ec; FMW)
- Reproductietoxicologie en epidemiologie (6 ec; FMW)
- Milieuchemie (code N28212; OUNL); www.ou.nl
- Organismen in hun omgeving (code N42112; OUNL); www.ou.nl
- Milieutechnologie (code N07321; OUNL); www.ou.nl

Management and Technology orientation
- Ecology and management of large rivers (3 ec; Biology, FNWI)
- Science & entrepreneurship (3 ec) zie www.studiegids.science.ru.nl/2007/mt
- Research Strategy & Management (3 ec) zie www.studiegids.science.ru.nl/2007/mt
- Industriële fijnchemie (3 ec) zie www.studiegids.science.ru.nl/2007/mt)
- Algemene managementvaardigheden (3 ec) zie www.studiegids.science.ru.nl/2007/mt
- Gender Aspects of Integrated Water and Natural Resources Management (3 ec; CSMR)
- Milieu en samenleving (4 ec; NSM)
- Gezondheidsbewaking (6 ec; FMW)
- Arbeidstoxicologie en milieuzorg (6 ec; FMW)
- Risico-evaluatie van milieufactoren (6 ec; FMW)
- (Arbeids)milieu en gezondheid: de rol van perceptie en communicatie (6 ec; CSMR)
- Interfacultaire cursus milieu, vrede en duurzame ontwikkeling (6 ec;CSMR)
- Milieuchemie (code N28212; OUNL); www.ou.nl
- Organismen in hun omgeving (code N42112; OUNL); www.ou.nl
- Milieutechnologie (code N07321; OUNL); www.ou.nl

Communication orientation, Education orientation and TWM-specialisation
- Wetenschap en Literatuur (3 ec; FNWI)
- Ecology and management of large rivers (3 ec, Biology, FNWI)
- Milieu en actor (6 ec; NSM)
- Interfacultaire cursus milieu,vrede en duurzame ontwikkeling (6 ec, see site of CSMR)
- Gender Aspects of Integrated Water and Natural Resources Management (3 ec; CSMR)
- Milieu en ontwikkeling (4 ec; NSM)
- Milieu en samenleving (6 ec; NSM)
- Milieuchemie (code N28212; OUNL); www.ou.nl
- Organismen in hun omgeving (code N42112; OUNL); www.ou.nl
- Milieutechnologie (code N07321; OUNL); www.ou.nl

2.5 Free space

The scope of the free space in the master's programme varies per orientation. You can work out the details of your free space at your own discretion, provided that the examining board approves the components of your choice. It is required that the components of the free space are of a master level.
You have the following options when determining your free space:

- Extending your traineeship from 30 to 45 credits.
- Increasing the number of environmental or environment specialistic modules (for example with modules that are part of Biology, Biomedical Sciences, Environment-Social Sciences or Law).
- Ocupation-oriented traineeship
- Other (meaning not environmental or environment specialistic), provided that it is of a master level.

Concrete examples of the courses in environmental sciences that can be followed as part of your free space include all of the courses listed under the optional courses.
The occupation-oriented traineeship (15 credits) may also concern part of your master's programme. You can do your occupation-oriented traineeship at a government authority or a social organisation, such as he Ministry of Housing, Spatial Planning and the Environment, the Ministry of Transport, Public Works and Water Management, a municipal authority or an environmental pressure group such as 'Milieudefensie'. The focus of this traineeship concerns the exploration of the field of action during which you become familiar with the structure and method of working.

2.6 Philosophy

The course in Philosophy is a mandatory component for all students of the RU and has been included in the programme because of the necessary insight that one must have in the (environmental) field of study and the degree of reflection that is required.
The philosophy course of your master's programme corresponds to 3 credits. Three courses of philosophy are descibed below. We refer you to the website for a more comprehensive description of other courses in philosophy: www.filosofie.science.ru.nl/1education.htm

Philosophy of Landscape and Nature

Course id: **FFIL209A** *3 ec* first quarter drs. M.A.M. Drenthen

Teaching methods
- 24 hrs tutorial

Pre-requisites
Students are expected to have completed the bachelor course 'Inleiding in de Filosofie en Ethiek'

Learning outcomes
After completing this course,
- the student is familiar with the major topics, approaches and concepts in environmental ethics and landscape philosophy
- the student can distinguish scientific reasoning form other forms of intellectual activity
- the student can take a substantiated position in ethical debates on issues of landscape and ecosystem management.
- the student can read, analyze and critically assess philosophical texts, and to apply them to actual cases
- the student can publicly present and discuss a philosophical text

Description
This course will discuss major topics in environmental ethics and landscape philosophy:
- The relation between environmental science and environmental ethics
- Basic attitudes toward and images of nature, anthropocentrism vs. ecocentrism
- Intrinsic value of nature: subjective? objective?
- The 'social construction of nature'
- Holism and deep ecology
- The conflict between animal ethics and ecological ethics
- Aesthetic reasons for environmental protection
- Nature development, biodiversity and the concept of wildness
- Bioregionalisme en the Ethics of Place

Literature
Texts and assignments will be available in Blackboard.

Examination
Attendance is mandatory. Grades will be based on group presentation (40%), written assignments (40%) and participation in class discussions (20%). There will be no final exam. Students have to apply for this course via Blackboard, at least two weeks before the start of the course. Maximum number of applicants.
This course will be taught in Dutch. Foreign students who are interested in this topic, are advised to sign up for the course 'Philosophy of watermanagement' (FFIL212).

Extra information
This course can be substituted by other advanced philosophy courses (see the courses on offer from the philosophy department)

Global Ethics and Sustainable Development

Course id: **FFIL210A** *3 ec* third quarter prof. dr. F.W.J. Keulartz
drs. I.E.M. Dankelman

Teaching methods
- 20 hrs seminar
- 60 hrs self tuition

Learning outcomes
Students should gain some basic insights in globalization processes and their impact on the possibilities and problems of sustainable development in its ecological, economic and social dimensions. They should be able to indicate and discuss issues of global ethics such as climate change, world trade, and food security.

Description
Sustainable development should at least encompass three dimensions, the environmental dimension (conservation), the economic dimension (growth), and the social dimension (equity), or Planet, Profit, People. These dimensions or pillars of sustainable development will be studied through the 2002 book *One World. The Ethics of Globalization* by famous philosopher Peter Singer. In this book, Singer argues that in an era of globalization we should develop an ethics without borders - a 'one-world-ethics'. To examine the most pressing issues of such a global ethics, texts of Thomas Pogge, Martha Nussbaum and others will be studied in addition to Singer's book. To provide these issues with concrete substance, lectures about these texts will be alternated with lectures on the impact of globalization on local communities in developing countries with respect to water management, land use, food security and so on.

Literature
- Peter Singer, *One World. The Ethics of Globalization*
  Yale University Press. 2004 (2nd edition
- Plus papers from Pogge, Nussbaum and so on

Examination
Students should study the literature, participate in discussions, make at least one presentation, and write a brief essay.

Philosophy of Watermanagement

Course id: **FFIL212**	*3 ec*	week 5 and week 7:	drs. M.A.M. Drenthen
		January 28th - Februari 1st	prof. dr. H.A.E. Zwart
		February 11th - february 15th	prof. dr. F.W.J. Keulartz

Teaching methods
The course will consist of lectures, seminars, presentations and an excursion to the Oostvaardersplassen Nature Reserve.

Pre-requisites
Students are expected to have completed the Bachelor philosophy course 'Inleiding in de filosofie en ethiek' or a similar introduction in philosophy

Learning outcomes
After completing this course,
- the student is familiar with the major topics, approaches and concepts in environmental ethics and landscape philosophy
- the student can distinguish scientific reasoning form other forms of intellectual activity
- the student can take a substantiated position in ethical debates on issues of landscape and ecosystem management.
- the student can read, analyze and critically assess philosophical texts, and to apply them to actual cases
- the student can publicly present and discuss philosophical texts

Description
In this course, we will deal with some philosophical aspects regarding water management. We will discuss the major topics from environmental ethics and landscape philosophy:
- The relation between environmental science and environmental ethics
- Basic attitudes toward and images of nature, anthropocentrism vs. ecocentrism
- Intrinsic value of nature: subjective? objective?
- Ecological restoration or faking nature?
- Conflict between animal ethics and ecological ethics
- Aesthetics and environmental protection
- The concept of wilderness
- Bioregionalism and Ethics of Place
- Excursion to the Oostvaardersplassen 'new' nature reserve

Literature
Texts and assignments will be made available in Blackboard.

Examination
Grades will be based on written assignments, on oral presentations and on participation in group presentations and class discussions. There will be no final exam.

Extra information
This course will be in week 5 and week 7 on a full time basis. **Attendance is mandatory.** Maximum number of applicants: 20. TWM-students will have prior access; foreign language students have prior access over Dutch-speaking students.

3 Description of Courses Environmental Sciences

Orientation in Environmental Research and Management

Course id: **MM012** *5 ec* 3-9-2007 till 17-12-2007 drs. M. Lindemann
dr. M.A.J. Huijbregts
dr. H.J.R. Lenders

Teaching methods
The course compromises *theme days* with *lectures, presentations* and *discussions, excursions* in the field, *visits* to organisations in the field of environmental management, *group assignments*, the *self assessment/vacancy analysis,* and *writing a reflection paper*.

Pre-requisites
The course is obligatory for students of the MSc Environmental Sciences and open to students of other programmes. In case of indistinctness, the examination committee takes the final decision on entry allowance.

Learning outcomes
The learning targets are threefold:
- the student can make an informal choice for a track in the Master of Environmental Sciences (Master orientation)
- the student can make an informal choice for an internship in the field of environmental research and management (internship orientation)
- the student can formulate a personal study path towards a working career based on his/her own qualities and preferences (job orientation)

Description
Master, internship and job orientation in environmental research and management by
- Presentations of and discussions with environmental researchers and (project) managers
- Excursions in the field and visit to organisations in the field of environmental management
- Lectures by teachers on environmental issues
- Group assignments based on application software dealing with environmental management issues

These teaching methods are related to the following five environmental topics:
- River basin morphology and management
- Institutional water management
- Ecology and management of estuaries and deltas
- Chemical pollution
- Water governance in interaction with river communities

To structure students' Master, internship and job orientation, they will carry out a self assessment/vacancy analysis during the course, and write a reflection paper at the end of the course.

Literature

The following study material will be provided:

- a student manual with general course information (downloadable via Blackboard)
- a reader with (additional) theoretical background documents (downloadable via Blackboard)
- relevant literature and information on the excursions and visits (e.g. booklets, background information)

Examination

The student writes a reflection report that includes the motivation for a Master track, an internship and a future career. For the report, students will receive a mark in terms of 'passed' or 'failed'. The examination of the course also embraces the assessment of student's participation. Absence at sessions without having reasonable grounds and/or a negative assessment of the participation, input and working attitude leads to student's exclusion from the final assessment of the course.

Environmental Sciences

Course id: **MM001** *5 ec* 04-9-2007 till 28-9-2007

dr. H.J.R. Lenders
drs. I.E.M. Dankelman
prof. dr. ir. A.J. Hendriks
dr. M.A. Wiering
dr. M.A.J. Huijbregts
dr. A.M.J. Ragas
drs. P. Vugteveen
prof. dr. ir. W.T. de Groot
dr. R.S.E.W. Leuven

Teaching methods
- 11 hrs lecture
- 12 hrs seminar
- 25 hrs tutorial
- 6 hrs self tuition

Pre-requisites
BSc Environmental sciences, Biology, Chemistry, Moleculair Sciences or Natural Sciences and students Transnational Ecosystem-based Water Management (TWM). The course is obligatory for master students Environmental Scienses and TWM.

Learning outcomes
The students have knowledge about and insight in the principles of sustainable development regarding the coherence of ecological, social, economic, and institutional aspects and can point out the role environmental scientists can perform in research concerning sustainable development.

Description
Students are given an introduction in the (scientific) backgrounds of sustainable development.
- Sustainable development: ecological, social, economic and institutional backgrounds and dimensions within a coherent framework.
- Multi- and interdisciplinary approaches of sustainable development research focussing on the role of environmental sciences: environmental biology, environmental chemistry, environmental physics, environmental social sciences, et cetera, inluding integrated environmental sciences)
- Concepts and methodologies for (integrated) environmental research (environmental modelling, multi-criteria analysis, risk assessment, ecological footprint, ecosystem health, Problem-in-Context)
- Project: scientific approaches to the Eel-fishery problem (designing a multi- or interdisciplinary research program based on acquired skills and knowledge)

Literature
Study material will be made available via Blackboard.

Examination
written open-book examination and evaluation of project results.

Environmental & Ecological Modelling

Course id: **MM002** *5 ec* 02-10-2007 till 26-10-2007 prof. dr. ir. A.J. Hendriks

Teaching methods
- 3 hrs lecture
- 5 hrs seminar
- 68 hrs tutorial
- 51 hrs self tuition

Pre-requisites
BSc Environmental Sciences, Biology, Chemistry, Moleculair Sciences or Natural Sciences and students Transnational Ecosystem-based Water Management.

Learning outcomes
After completing the course the student should be able to
- Indicate why and where models are needed in research and management on environmental, nature and water issues.
- Classify and evaluate environmental and ecological models (analytical, numerical, stochastic, deterministic etc.)
- Identify and follow the stages in model development in a structured approach (from derivation to validation)
- Understand and apply elementary expressions that are often used in environmental and ecological modelling (conceptual diagrams, logical rules, mathematical equations)
- Describe the structure and behaviour of basic modules (differential equations) that are common in many environmental and ecological models
- Build and apply simple models critically in the context of environmental research and management.

Description
Conclusions from research and decisions by management on complex environmental, nature and water issues are often based on models. Consequently, future researchers, consultants and managers in this area need a minimum background on modelling, which is provided in the present course.
The modules starts with an introduction in modelling, discussing objectives, types and stages of models. Basic expressions (conceptual diagrams, logical rules, mathematical equations) and modules (sources, loops, series, parallel elements, webs) are described. These are linked to major processes and patterns that occur in ecosystems (air, water, soil, substances, plants, animals). There is a strong focus on models that are used in environmental, nature and water sciences but the basic knowledge is applicable to other disciplines as well. Students participate actively in this course by exploring model needs, by carrying out exercises, by developing their own (simple) model and by discussing models with experts.

Literature
Study material will be made available via Blackboard

Examination
Combination of written exam and project.

Integrated Environmental Assessment for water management

Course id: **MM003** *5 ec* 30-10-2007 till 23-11-2007 dr. R.S.E.W. Leuven

Teaching methods
- 15 hrs lecture
- 11 hrs laboratory class
- 42 hrs tutorial
- 61 hrs self tuition

Pre-requisites
BSc Environmental sciences, Biology, Chemistry or Natural Sciences and students Transnational Ecosystem-based Water Management.

Learning outcomes
Competences
- Capable in a multidisciplinaty team to contribute to an integrated environmental assessment of a water system (environmental outlook) and to recommend measures for sustainable design, use and management based on contemporary concepts for water management

Skills
- Able to collect, interpret and integrate data on the structure and functioning of water systems in order to analyse environmental problems in water management
- Able to assess implications of policy documents and legal instruments (e.g. function assignment and environmental quality standards) for the design, use and management of water systems
- Able to apply a selected number of scientific methods and (predictive) models for effect assessment of alternatives or scenarios for management of water systems
- Able to formulate recommendations for sustainable design, use and management of water systems

Essential notions
- Knowing the scientific bases of integrated assessment
- Having knowledge of rehabilitation measures for lowland river systems
- Having knowledge of contemporary (ecological) concepts for water management
- Being familiar with the administrative organisation, policy planning, legal instruments and stakeholders in water management

Description
The course offers the theoretical backgrounds and methods for integrated environmental assessment of water systems:
- Definition, theoretical backgrounds and components of integrated approaches
- Actors in water management (organisation of water management, tasks and authorities of national and international water managers, role of stakeholders, actor analysis)
- Current concepts for water management (integrated, adaptive, dynamic, sustainable, transnational and ecosystem based water management)

- Structure and functioning of water systems with special attention to environmental problems in lowland river systems (such as pollution, unbalanced land use and management, regulation and canalization and climate change)
- Scientific methods for the underpinning of integrated assessments and sustainable use and management of water systems (approaches, models and tools)
- Policy and legal instruments for water management (international obligations such as European Water Framework Directive and catchment management planning)
- Functions of and norms for water systems
- Sustainable management measures for water systems

A multidisciplinary project focusses on an integrated environmental assessment (i.e. environmental outlook) for a water system. A real case will be simulated: the environmental outlook must deliver the scientific basis for an integrated river basin management plan and should recommend sustainable design, use and management of a specific water system (river reach).

Literature
Study material will be made available via Blackboard.

Examination
Written open book examination and evaluation of project results.

Principles of Human Agency

Course id: **MM006** *4 ec* 27-11-2007 till 21-12-2007 prof. dr. ir. W.T. de Groot
drs. M. Lindemann

Teaching methods
- 10 hrs lecture
- 8 hrs seminar

Pre-requisites
All students can join the course Principles of Human Agency, if they have permission for joining the Master Programme Environmental Sciences or Biology. For students of the specialisation Transnational ecosystem based Water Management this course is obligated.

Learning outcomes
Ability to work with actors and communities is essential for successful river management. This course lays the scientific basis for this ability. It focuses on the enhancement of understanding of why people and communities act the way they do.

Description
- Introduction to the course
- Rational choice theory
- Extended and alternative perspectives on human agency
- Visions of nature, river and risk
- Theories on collective human action
- Social identity and intergroup conflicts in river management
- Gender aspects in water management

Literature

- Ashmore, R.D., Jussim, L. & Wilder, D. 2001, Social identity, intergroup conflict, and conflict reduction. Oxford University Press. New York.
- De Groot, W.T. 1992, Environmental science theory: concepts and methods in a one-world, problem-orientated paradigm. Elsevier Science Publishers B.V., Amsterdam.
- De Groot, W.T. 2002, The curious Dutchmen and their nature. Translated from the Dutch written paper 'De wonderlijke Nederlanders en hun natuur'. De Hinkelnymf lente 2002: 6-7.
- De Groot, W.T. 2005, Self-based ethics. Translated from the Dutch written paper 'Natuurbeelden, eco-spiritualiteit, en het postmoderne zelf'. Radboud University Nijmegen.
- Elster, J. 1999, Nuts and bolts for the social sciences. Cambridge University Press, Cambridge.
- Lindemann, M. 2004 (submitted): Understanding flood images of people in river regions: a conceptual framework. Centre for German Studies and Centre for Water and Society. Radboud University Nijmegen.
- Lindemann, M. 2005 (in preparation): River images of people in Dutch and German river regions. Centre for Water and Society. Radboud University Nijmegen.
- Ostrom, E. 1990, Governing the commons: the evolution of institutions for collective action. Cambridge University Press, Cambridge.

Examination
Open book written examination (70%) and preparing the discussion sessions by means of formulating questions after studying literature (75% of 30%). Presentation of questions during discussion session (25% of 30%).

Methods for Integrated Analysis, Planning and Evaluation

Course id: **MM005** *3 ec* 07-01-2008 till 25-01-2008 prof. dr. ir. W.T. de Groot
drs. M. Lindemann

Teaching methods
- 7 hrs lecture
- 7 hrs seminar

Pre-requisites
All students can join the course Methods for Integrated Analysis, Evaluation and Planning, if they have permission for joining the Master Programme Environmental Sciences or Biology. For students of the specialisation Transnational ecosystem based Water Management this course is obligated.

Learning outcomes
An important element in the tasks of river managers is the execution or commissioning of integrated, interdisciplinary forms of problem analysis, opportunity identification, design of plans and the evaluation of alternative courses of action, either within the profession of jointly with other agents such as local communities. The course aims to deliver elements for that work, in a mix of practical tools and academic insights in their applicability and adaptability.

Description
- Introduction to the course
- Problem-in-context revisited
- The role of complexity, changes and turbulence in environmental management
- Visions and conflicts in environmental management
- Stakeholders and consultation in environmental management
- Co-management and local knowledge in environmental management
- Looking at values I: Functions and values of the environment, ecological valuation
- Looking at values II: Economic valuation techniques (Multicriteria analysis (MCA), Environmental Impact Assessment (EIA), Cost-benefit analysis (CBA) and two-tiered valuation)

Literature

- De Groot, W.T. 1992, Environmental science theory: concepts and methods in a one-world, problem-orientated paradigm. Elsevier Science Publishers B.V., Amsterdam.
- Edwards-Jones, G, Davies, B. & Hussain, S. 2000, Ecological economics: an introduction. Blackwell Science Ltd.
  Environment Protection Agency - EPA 1995, Community consultation and involvement. Commonwealth of Australia.
- Leeuwis, C. 2004: Communication for rural innovation. Blackwell Publishing company.
- Mitchell, B. 2002, Resource and environmental management. 2nd edition. Pearson Education Limited.
- Pröpper, I. & Steenbeek, D. 2001, De aanpak van interactief beleid: elke situatie is anders. Uitgeverij Coutinho. Chapter 3 translated from Dutch. Bussum

Examination
Open book written examination (70%) and preparing the discussion sessions by means of formulating questions after studying literature (75% of 30%). Presentation of questions during discussion session (25% of 30%).

Research Skills

Course id: **MM013** *3 ec* 01-09-2007 till 31-8-2008 dr. R.S.E.W. Leuven
dr. H.J.R. Lenders
prof. dr. ir. A.J. Hendriks
dr. A.M.J. Ragas

Teaching methods
- 4 hrs lecture
- 70 hrs self tuition
- 6 hrs tutorial

Pre-requisites
BSc Environmental sciences, Biology, Chemistry or Natural Sciences and students Transnational Ecosystem-based Water Management.

Learning outcomes
- Able to search, to manage and to refer consistently scientific literature references.
- Able to describe the "standard" contents of a research article and to apply this knowledge to increase the quality of papers.
- Able to discuss relevance of various interview techniques for different types of information and to prepare a formal interview.
- Capable of drawing up a research design (including a realistic time schedule) for a master thesis and expressing clearly and understandably how the research project is set up.

Description
The course is focused on competences, skills and knowledge that will be required for drawing up a feasible design of a master research project in environmental science and for preparation of master thesis or scientific publication about the results of that project.

Literature
Student manual and reader will be available on Blackboard

Final Assignment

Course id: **MM009** *4 ec* 03-09-2007 till 31-08-2008 prof. dr. ir. A.J. Hendriks

Teaching methods
- 6 hrs lecture
- 100 hrs self tuition

Learning outcomes
After the final assigment the student will be able to write a research proposal that is in line with his or her future career plans.

Description
The final assignments is an individual assignment with the aim to prepare the student for the job market. The assignment is not fixed, but depends on the career perspective of the student. Example options for the final assignment are:
- Preparation of an academic research proposal (e.g., for NWO);
- Development of a commercial research offer (e.g., for a consultancy firm);
- Preparation of a research application (e.g., for a local government).

Literature
Not applicable.

Examination
The final assignment will result in a report (i.e., research proposal, offer or application) which will be graded.

4 Courses of the different orientations in Environmental Sciences

4.1 Master courses of the M&T-orientation

Business & Society

Course id: **FMT001B** *5 ec* fall semester dr. G.A.N. Vissers
prof. dr. B. Dankbaar

Teaching methods
- 28 hrs lecture

Pre-requisites
Master student FNWI

Learning outcomes
The aim of this course is for students to:
- Develop an understanding of the processes of mutual influence that exist between science, technology, economy, and society, and get acquainted with concepts and theories from economics and social sciences that seek to explain these processes.

Description
Of the courses within Management & Technology curriculum, Business & Society is the first to be given. The course will provide students with an overview of theories and perspectives concerning the position and the functioning of firms and industries in the wider economy, national and international, and in society. In particular, themes from industrial history and industrial economy will be explored, but also issues related to current concepts like 'information society', 'knowledge economy', and 'globalization'. These subjects will be discussed, partly on the basis of project assignments, and their implications for the university, firms, and government will be considered.

Subjects
- Economic history, especially industrial development in the 20th century
- Industrial revolutions and economic change
- National and regional differences within and between market economies
- National and sectoral systems of innovation
- The interactions between technology and organization
- The knowledge economy

Literature
Thomas K. McCraw (ed.), *Creating Modern Capitalism. How Entrepreneurs, Companies, and Countries Triumphed in Three Industrial Revolutions*, Harvard University Press, 1997

Examination
Written assignment and group presentation

Organization Theory

Course id: **FMT002B** *5 ec* spring semester prof. dr. B. Dankbaar

Teaching methods
- +/- 15 lectures (see for detail Blackboard)
- practices

Pre-requisites
MT Course Business & Society

Learning outcomes
- Students acquire knowledge of the main concepts and approaches in organization theory
- Students are able to apply this knowledge to issues of organizational design and change

Description
This course offers an introduction into the fundamental insights of organization theory dealing with questions like: What are organizations? How are they structured? How do they interact with their environment? What is organizational culture? And how are organizations designed and managed? Organizations are complex systems and consist of people with different interpretation-schemes. As a result, organizations have to deal with a variety of problems and dilemmas. The course offers students methods and instruments to diagnose organizational problems and to deal with the problems and dilemmas of organizing.

Apart from studying and discussing a text on organization theory, the students will make presentations of their analysis and views on selected business cases

Literature
Gareth Jones, Organization Theory, Design and Change, 5th edition

Examination
Written examination and discussion of a business case

Innovation management

Course id: **FMT003B** *5 ec* fall semester drs. ing. P.M. Vos
ir. L.J. Lekkerkerk

Teaching methods
- 30 hrs tutorial

Pre-requisites
- Master student FNWI
- BEM & Organisatiekunde in completion with a minimum of a 6

Learning outcomes
The purpose of the course is for students to :
- Acquire knowledge in the field of innovation management including Research and Development and New Product Development
- Apply this knowledge in theoretical cases, eventually acquire sufficient knowledge to apply this knowledge in 'real life' settings
- Judge the value of scientific knowledge in the field of innovation management including Research and Development and New Product Development
- Learn how to design a research project in this field

Description
Innovation determines the dynamics of the economy. Organizations innovate to stay viable. This course focuses on issues of innovation from a management perspective. The main issues concern the dilemmas of innovation management and innovation enhancement: how (and to what extent) are these processes manageable? In these processes different factors play an important role, such as creativity, enterpreneurship, structure, linkages, and a bit of luck. This course offers the student knowledge about the structure and nature of the innovation process (product as well as process innovation). Furthermore, it offers the students instruments to cope with the different dilemmas of innovation management.

Subjects
The following themes will be treated:
- Managing for innovation
- Strategy
- Establishing effective external linkage
- Building effective implementation mechanisms
- Creating the innovative organization
- Assessing and improving innovation management

Literature
Not Available (See Black Board)

Examination
assignments and a written exam

Strategy & Marketing

Course id: **FMT004B** *5 ec* fall semester

Teaching methods
- +/- 15 interactive lectures including guest lectures (see for detail Black Board)
- individual assignments
- a group project to develop a well-founded Business Plan for a high-tech product or service.

Pre-requisites
- Master student FNWI
- BEM & Organisatiekunde in completion with a minimum of a 6

Learning outcomes
After completion of the course, students are familiar with market oriented views of innovation and with several important forms of market research; they are able to describe the circumstances in which market orientation will influence innovation processes and to discuss the nature of such influence for business and product development. Students will also be familiar with strategy formation, with different types of strategy and the related perspectives, and with the relationships between general business strategy and innovation strategy.
Prime course objectives are that:
- participants acquire updated insights regarding challenges and opportunities in high-tech markets
- participants understand the virtue and limitations of traditional strategic marketing thinking and tools in emergent, high-tech markets, and
- participants apply their understanding of strategy and marketing concerning High-Technology to develop a well-founded business plan within their own technological discipline.

Description
Marketing is the business function that deals with discovering and meeting customers' unfulfilled needs and wants. Strategy underlines the need to align this function to the objectives of the business, the other business activities and -last but not least- to the external market environment of the firm. Strategic marketing in high technology environments poses its own unique challenges due to the complexity and novelty of the technology. Some of those challenges include articulation of the value proposition, decision making with limited information on customers, and coordination with other market players. In order to succeed in this environment, firms need to be able to understand unarticulated needs, forecast the development of nascent markets, and position themselves appropriately in the competitive landscape.

High-tech firms operate under conditions characterized by high degree of market and technological uncertainty. Technological changes can occur rapidly. Products offered are novel and for buyers often difficult to evaluate. Moreover, high-tech firms often operate in emergent industries with "fuzzy"and rapidly changing industry boundaries. Such conditions -deviating from those captured in most marketing texts- represent specific challenges for high-tech firms to survive and prosper. It should also be noted that the rapid developmentes in modern technologies within science (e.g. biotechnics, informatics, chemics, mathematics, etc.) exert

influence on markets and marketing practices only superficially dealt with in traditional strategic marketing textbooks. The "driving question" that arises form the situation described above is: "Provides strategic marketing added value for firms operating in high-tech markets?"And, if so, "why and how ?"

The focus of this course will be on the strategic marketing to accompany a technology and not on the technical or scientific aspects of the high-tech products. Besides lectures, students will work on a group project (i.e. to set up a High-tech Business Development Plan) throughout the term to analyze the marketing strategy for a technology-based product or service.

This course focuses on issue related to strategy and marketing of firms, such as:
- Technology and market
- Relation between R&D and Marketing
- Business strategy and product strategy
- Market research
- Relation with customers
- Distribution, supply chain and pricing

Literature
- Mohr, Sengupta, Slater (2005) *Marketing of High-Technology Products and Innovations* (2nd international edition) Pearson Prentice Hall, ISBN 0-13-123023-9
- Reader (links of articles will be published at Blackboard)

Examination
- Written exam (literature)
- Report and Presentation project

Finance & Accounting

Course id: **FMT005B** *5 ec* spring semester drs. R.A. Minnaar

Teaching methods
- +/- 15 lectures (see for detail Black Board)
- practices

Pre-requisites
Master student FNWI

Learning outcomes
The financial accounting part should give you a firm understanding and working knowledge of:
- The basic accounting terminology and the process for recording, summarizing and reporting economic events of a business enterprise;
- The interpretation and analysis of financial statements as a basis for business decisions.

The management accounting part is to develop the student's knowledge of the process of evaluating performance and decision making using accounting information as a basis. After taking this course you should be able to interpret, use and evaluate internal accounting information.

Description
Accounting information is an integral part of the business environment and an understanding of accounting information is an essential tool in the process of making business decisions. The primary objective of this course is to develop the student's knowledge of accounting as a tool in making business decisions. The emphasis in this course will be on both the user and the preparation of accounting information in a business context.

This course consists of two parts: Financial accounting and management accounting.

In the financial accounting part, you will be introduced to accounting theory and practice using the models of sole proprietorships and corporations, with an emphasis on merchandising companies. The emphasis and focus of financial accounting is on financial information used by parties' external to the firm. Specific topics will include: the definition and scope of accounting; systems used to account for and control transactions; inventory costing; the measurement of income and equity; and a special emphasis on financial reporting and the analysis of financial statements.

The management accounting part of this course emphasizes the use of accounting information for internal planning and control purposes. As business managers, you will be involved in a variety of management decisions. Some examples of the issues that you might encounter include: "How much should we charge for this product or service?"; "What elements contribute the most to this business?"; "How is my company doing compared to the competitors?"; "Is this person a good manager?"; "Are my costs under control?" "Does this capital investment make sense?" A range of information may influence such decisions and management (internal) accounting information is among the most significant.

In this part, the fundamentals of managerial accounting, profit and cost accumulation are introduced. Specific topics covered include: cash flows, capital budgeting, cost allocation, product costing, differential costing for short and long-term decisions, performance evaluation, and the concepts related to the time value of money.

Literature

Needles, Powers & Crosson; Principles of Accounting 2008e, Tenth Edition; Houghton Mifflin; ISBN 0-618-73661-1989-4

Examination

- A final written 3 hour exam with open questions.
- Bonus points based on assignments, cases, participation and mid-term test.

Master-thesis Management & Technology-track

Course id: **FMT010B** *27 ec* spring semester prof. dr. B. Dankbaar
drs. ing. P.M. Vos

Teaching methods
- Self tuition (under supervision)

Pre-requisites
- finished the required courses and 'master-research' in their own discipline
- successfully completed the required courses of the MT-track: Business & Society, Organization Theory, Innovation Management, Strategy & Marketing, and Finance & Accounting.

Description
The master-thesis consists of performing a research project on the interface of science, technology, society and organization. This research project will be performed in a profit or non-profit organization. It is important that the student is performing research contributing to the solution of an organizational or practical problem for which a combination of knowledge from natural science and management science is required or at least useful. The duration of the project should normally not exceed six months, from the start until final presentation of the thesis. Examples of research topics are:
- Diagnosing the implementation of technological innovation in organizations;
- Developing a business plan for a new product;
- Doing market research for a high tech product;
- Developing and/ or evaluating instruments for assessing and developing HRM-policy in R&D departments;
- Developing instruments to improve collaboration between university and companies;
- Developing en/ or evaluating public policy-instruments on innovation, science, and environmental issues;
- For inspiration, see also the MICORD-research program (see ISIS- web site)

The project consists of the following “stages”, which are all closed with a specific activity:
- Preparation of research, resulting in a research proposal
- Performing research, resulting in a research report
- Presenting the results of your research at the organization involved
- Defending your research report at the university

Literature
- Guidebook of the final MT research project (presently only available in Dutch), see the MT- web site

We advise you to use books about how to do business research, for example:
- Saunders, M. et al. (2003), *Research Methods for Business Students* (3th ed.). Harlow: Prentice Hall.
- Cooper, R., Schindler, P., S. (2006) *Business Research Methods* (9th ed.), McGrawhill, New York

Examination
- See guidebook

4.2 Master courses of the C-orientation

Introduction Science Communication

Course id: **FC001B** *3 ec* first quarter dr. J.G. van den Born

Website
www.betacom.science.ru.nl

Teaching methods
- 7 hours lectures
- 7 hours seminars

Pre-requisites
This is the first course of the Mastertrack Science Communication. It is part of the obligatory programme of the Mastertrack. In addition the course is open as an optional course for all MSc. students.

Learning outcomes
- Students are familiarised with science communication practice
- Students are familiarised with science communication theory
- Students are trained by a professional in presentation techniques

Description
Nowadays every scientist gets involved in science communication in his or her professional life. In this course we give an overview of science communication strategies and of seminal views on science communication practices and theories.

Focus is on communication with the public and with target groups within the general public on issues that involve scientific knowledge. Scientific communication (communication among scientists for instance at scientific meetings) is not the main issue, although the training in presentation techniques applies to those communication practices as well.

Students will also study and present classic examples of succesful popularization of scientific insights, in the shape of TV documentaries, films, fiction and non-fiction books, and 'visitables'.

Literature
Reader or book to be purchased at the start of the course

Examination
Written exam, participation and presentation

Extra information
Monday 13.45-15.30
First meeting 10 September 2007

Science & Societal interaction

Course id: **FC002B** *3 ec* third quarter dr. J.G. van den Born

Website
www.betacom.science.ru.nl

Teaching methods
- 7 hrs lecture
- 7 hrs tutorial

Pre-requisites
Basic articles from the reader of the course: 'Introduction Science communication'.

Learning outcomes
The student:
1. develops knowledge and understanding in the field of public participation, regarding natural-scientific topics in societal processes.
2. applies this knowledge by developing a participation-plan. Attention is paid to different levels of participation and methods and tools of participation. Also, a distinction of the different stakeholders is made, and ways to reach them are explored.
3. is introduced in and applies the methods and tools for the design of an objective and research questions of a research plan.
4. is able to formulate an advice by means of a group discussion and to present and argue this advice in front of experts in the field of participation.

Description
Science communication is usually not a linear process, but comes into being through interaction. In this course is dealt with ways to involve citizens and other stakeholders in an interactive process when scientific topics are on the agenda. Questions as why would you involve stakeholders and why not, who would you involve and on which level are under discussion. With regard to the question who to involve it is important to get a grip on 'the public'; who will and can be involved? And what are the benefits for people to participate in such a process? Finally, we learn about the different methods and tools that can be used in the planning of a participation project, such as debates and focus groups.

In this course the students are introduced in the basic principles of stakeholder participation, students design a participation plan themselves and debate with experts on the field of participation on an actual case.

Literature
- Reader (can be purchased at the start of the course).
- Verschuren, P. en Doorewaard, H. (2004). Het ontwerpen van een onderzoek. Lemma. ISBN 90-5189-886-X. 223 pagina's.

Examination
An assignment.

Risk Communication

Course id: **FC003B** *3 ec* second quarter dr. A.F.M.M. Souren

Website
www.betacom.science.ru.nl

Teaching methods
- 7 hrs lecture
- 7 hrs tutorial

Pre-requisites
The course builds on previous courses from the Mastertrack Science Communication, and is part of the obligatory part of the Mastertrack. In addition, the course is open as an optional course for all MSc. Students.

Learning outcomes
- Students are familiarised with the specific characteristics of Risk Communication in relation to Science Communication
- Students are familiarised with actual cases and practices in Risk Communication
- Students are familiarised with the difference between Risk Communication and Uncertainty Communication
- Students are familiarised with determinants of public perception of Risk and Uncertainty
- Students are familiarised with the role of the different actors and stakes in Risk Communication (for instance companies, government, local population) and how to position themselves among these actors

Description
Present day society has been characterised as a Risk Society. The communication of risk and the public understanding of risk have become important issues in the professional careers of scientists inside and outside universities. This course prepares MSc. students for those instances where they will become involved in risk communication in their professional career. Those instances can be unexpected and confronting. For instance when you are consulted as an expert to report in the 8 o'clock news. In those cases you have to decide whether or not to be explicit about the risks for vulnerable groups, or whether or not to mention the current scientific debate over the exact height of the risk. Those choices are complicated and involve ethical and scientific considerations. To others, risk communication will become part of their professional career more frequently, while informing society about possible impacts of scientific techniques, medical treatments, environmental threats or the possible effects of their life style.
The course aims to prepare students to actively engage in risk communication and to analyse, reflect on and assess risk communication practices.
The course combines a practical and theoretical component. Discussions among students, teachers and guest speakers are matched with analyses of current scientific insights on issues of risk communication, risk perception and uncertainty.

Literature
Reader or book to be purchased at the start of the course

Examination
To be announced

Framing Knowledge

Course id: **FC0010C** *3 ec* first quarter dr. J.G. van den Born

Website
www.betacom.science.ru.nl

Teaching methods
- 6 hrs lecture
- 8 hrs tutorial

Pre-requisites
The course 'risk communication' is recommended.

Learning outcomes
The student:
- will be introduced in the field of cognitive psychology (knowledge)
- will have insight in the role of perceptions, interests and strategies in conflict situations (knowledge)
- can cooperate in a group of fellow students with regard to the assignment (skills)
- can design an interview guide, learn to interview, and to work out and interpret the interview results (skills)
- can debate (skills)

Description
Framing knowledge is an introduction into perceptions; frames that individuals use to look at and understand the world around them. It is important to be conscious of the fact that everyone has their own background and patterns of thought. For example, a farmer has a different idea of what nature is than a city dweller, and a scientist has a different perception of a laboratory animal than an ethicist.

When looking closer at laborious and failed negotiations, it is not impossible that different perceptions are underlying the whole matter, perceptions the stakeholders are often stuck to. To recognize these frames is the first step of understanding and solving a conflict. Connected to these frames are individuals (or groups) interests and strategies to act and negotiate.

In this course the students are also introduced to the basic principles of interviewing, they learn to design an interview guide and finally interview a stakeholder in the case we investigate during the course.

Literature
reader (can be purchased at the start of the course).

Examination
An assignment.

Knowledge Society

Course id: **FC0011C** *3 ec* third quarter dr. A.F.M.M. Souren

Website
www.betacom.science.ru.nl

Teaching methods
- 7 hrs lecture
- 7 hrs tutorial

Pre-requisites
The course builds on previous courses from the Mastertrack Science Communication(especially Risk Communication) , and is part of the obligatory part of the Mastertrack. In addition, the course is open as an optional course for all MSc. Students.

Learning outcomes
- Students are familiarised with the different roles of scientists in the Knowledge Society
- Students are familiarised with the implications for science communication
- Students are familiarised with shifts in the knowledge infrastructure and with techniques and strategies to analyse these shifts
- Students are familiarised with the pro's and con's of multi-, inter-, and transdisciplinary-settings they will encounter in professional contexts
- Students are trained in essay-writing

Description
Present day society has been characterized as developing towards a 'Knowledge Society'. Scientific knowledge has become more important and new technologies have a sometimes unprecedented impact. At the same time, the position of (academic) science is under pressure and apparent shifts take place in the role and authority of science in society. Knowledge is an issue.

In this course we reflect on these changes, and discuss the possible implications of these shifts for MSc. students in their future professional life. We ground these discussions in actual working practice brought to the classroom by guest speakers, and complement these by models and approaches that are currently used in assessments of the Knowledge Society.

The course combines a practical and theoretical component. Discussions among students, teachers and guest speakers are matched with analyses of current scientific insights on the Knowledge Society. A professional training in essay-writing completes the course.

Literature
Reader or book to be purchased at the start of the course

Examination
Essay

Science & Media: strategies and trends

Course id: **FC0013C** *3 ec* second quarter H.M. Dresen
drs. R.P.M.M. Welters

Website
www.betacom.science.ru.nl

Teaching methods
- 14 hrs seminar

Pre-requisites
This course is part of the Mastertrack Science Communication, and also open as optional course for all MSc. students.
In either case, finishing the course Introduction Science Communication is a pre-requisite for taking part in this course.

Learning outcomes
- students will increase their abilities in media-oriented writing, and will be shown ways how to further increase these abilities in the near future.
- students will increase their knowledge of the strategical considerations and ethical codes involved in the process of transmitting information from the academic to the public arena.
- student will gain understanding of a) the current state of science reporting in the media and b) ways in which the representation of science and technology in the media has changed over the last few decades.
- students will get acquainted with several methodological alternatives for studying trends in science reporting in the media (as a subfield within the Social Studies of Science)

Description
The course consists of two interrelated parts:
1. A training in media-oriented writing (given in Dutch), which will adress both the process of writing itself and the broader strategical and ethical considerations involved in the process of transmitting information from the academic to the public arena.
2. An introduction to the academic field of studying Science-in-the-Media, as a subfield within the Social Studies of Science. The examples we will study are intended to increase the students understanding of the current state of science reporting in the media. While studying these examples, the students will also get acquainted with different methodological alternatives for studying trends in how the media represent scientific expertise.

Literature
Course material will be available at the start of the course

Examination
Journalistic writing assignment & analytical assignment

Extra information

Part of this course (i.e. the training in media-oriented writing) will be given and examined in Dutch, as it is aimed at gaining access to the Dutch media landscape. Participants who do not write Dutch need to register six weeks in advance of the start of this course by sending an email to the coordinating lecturer of this course (H.M. Dresen) asking for an English language arrangement.

The number of participants for this course is limited, due to the character of the training in media-oriented writing. Students will be accepted in the order of their registration. Students of the Science Communication mastertrack have priority in placement, if they register six weeks in advance of the start of this course.

4.3 Master courses of Transnational ecosystem based Water Management (TWM)

Remark: The following courses are all lectured in Germany (University of Duisburg-Essen, campus Essen).

Hydrogeology
(2 ec; PD Dr. J. Wiegand, Prof. Dr. U. Schreiber)

Learning Targets
A fundamental understanding of the principles in hydrogeology (clastic, fractured and karst aquifers). This includes:
- the hydrologic circle
- hydraulic properties of rocks
- groundwater dynamics and hydraulics
- groundwater physics and chemistry
- use of groundwater
- groundwater protection

Contents
- Introduction to hydrogeology (groundwater dynamics and properties), groundwater use (pump testing, drilling), environmental issues (groundwater chemistry and physics)
- Practical methods in the field (Lower Rhine)
- Exercises in the classroom

Applied Hydrogeology
(4 ec; Prof. Dr. U. Schreiber)

Learning Targets
The students
- gain an overview of methods to characterize groundwater systems (acquisition of geologic information and hydraulic parameters) and know how to apply them
- have knowledge on chemical classification of groundwater (geochemistry of natural and contaminated groundwater)
- are able to set results of analysis and measurements in relation to environmental questions and to give a constrained summary of the situation (geological report)

Contents
Theory: hydrologic cycle: (main focus: groundwater system), aquifer properties, groundwater movement (recharge, flow, discharge) in porous medium, aquifer-types (confined, unconfined), construction of piezometric surface, data interpretation of chemical and other characteristic parameters (e.g. temperature, electrical conductivity), demonstration of modelling software.
Practical course: well-tests; sampling methods (e.g. groundwater, unconsolidated sediments and soil), chemical analysis (groups of 8 to 10 students).
Interpretation of hydrogeologic data on the basis of current questions in planning, construction environmental science, (preferably in cooperation with consultants working on actual problems).

Hydraulics and Sediment Transport
(3 ec; Univ. Prof. Dr.-Ing. habil. H. Patt)

Learning Targets
The students
- become familiar with the field of hydraulics and the important physical influences upon it
- are able to design channels for given flows and conditions
- learn the fundamentals of sediment transport
- learn the principles of flow modeling in hydraulic engineering
- gain understanding of the methods and applications of hydraulic research

Contents
Fields of hydraulic applications - overviews, flow in channel, sediment transport, hydromechanical models, hydraulic engineering research

Ecology and Protection of Freshwater Ecosystems
(2 ec; Dr. C.K. Feld, Dr. P. Podraza)

Learning Targets
The students
- gain knowledge of different freshwater ecosystem and classifications
- gain knowledge of related environmental impacts and stressors
- gain knowledge of and practice with freshwater ecological assessment and monitoring
- gain a basic understanding of applied water management
- gain knowledge of basic multivariate tools to analyse ecological data
- are able to transfer freshwater ecology into actual policies (e.g. the Water Framework Directive)
- are able to gain and filter information to understand and explain water-related problems
- are able to derive measures to protect freshwater ecosystems

Contents
A-priori and a-posteriori typology of freshwater ecosystems (rivers, lakes), impacts of different perturbations (pollution, eutrophication, acidification, pesticides, hydromorphological alteration, waterpower) on aquatic ecosystems, river and lake assessment according to national and international regulations, the organism groups addressed by the Water Framework Directive and how to use them in biomonitoring, transferring monitoring results into restoration measures, lake and river restoration, impact of global climate change.

Determination Exercises on Aquatic organisms
(3 ec; Dr. P. Podraza, PD Dr. D. Hering)

Learning Targets
The students
- get an overview on organism groups inhabiting freshwaters and marine waters
- are capable to use determination keys
- know about morphological and autecological characteristics of organism groups

Contents
Algae, Protozoa, Bivalvia, Gastropoda, Annelida, Entomostraca, Malacostraca, insect larvae, insect adults, insect special groups, fish, amphibians, birds; extension to macrophytes possible.

Hydrobiological Field Trips
(2 ec; Dr. P. Podraza, PD Dr. D. Hering, NN)

Learning Targets
The students
- are able to recognize different types of aquatic and semi-aquatic ecosystems and know about their special properties and reactions regarding the biotic and abiotic features
- know in which way water works influence aquatic systems and what kind of measures may be applied to reduce the impact
- apply field methods to analyse the status of an ecosystem

Contents
One ecosystem type or restoration measure / field trip. Examples:
- hyfromorphology and community composition of near natural and degraded lowland streams
- hydromorphology and community composition of near natural and degraded mountain streams
- stressors on large rivers (Rhine, Ruhr): flood protection, water power generation, reservoirs
- fish migration devices

Water Pollution
(2 ec; Dr. Kai Bester)

Learning Targets
The students
- know different sources of surface water pollution
- get to know and apply methods to take water samples as well as means to determine pollutants in surface waters
- are able to interpret results of chemical analyses in the context of European legislation

Contents
- Determination of traces of organic compounds in water: sampling, extractions, clean up, determination by means of gas-chromatography with mass spectrometry as well as high performance liquid chromatography
- Evaluation of contamination, connection to water framework directive

Basics of Hydraulic Planning and Facility Design
(3 ec; Prof. Dr.Ing. H. Patt, Dr.Ing. H.C. Baumgart)

Learning Targets
The students
- learn the fundamental relationships between hydraulics, hydrology, water management and hydraulic engineering
- be able to estimate the important interdependencies that arise during the planning and design of hydraulic facilities

- learn to evaluate the influence of new facilities on existing ones (keywords: building on and in the water)
- acquire knowledge of the fundamentals of flood planning and the design of waterways

Contents
Understand the important relationships between hydraulics, hydrology, water resource management and hydraulic engineering; design of hydraulic structures and upgrade of existing facilities (in particular, methods of watercourse construction as well as weirs and dams); concepts of flood control.

Waste Water Treatment (2 ec; Dr. M. Denecke)

Learning Targets
The students
- gain knowledge of wastewater biology and chemistry
- gain understanding the fundamentals in the field of Urban Water Management
- master the design of individual facility components of wastewater treatment plants

Contents
Sources and composition of wastewater, basic biological processes, activated sludge plants, trickling filters, nitrification, denitrification, P-elimination, anaerobic processes, sludge treatment, mass balances.

Flood Management (2 ec; Prof. Dr. A. Schumann, Dr. M Pahlow)

Learning Targets
The students
- gain a solid foundation in hydrological aspects related to floods
- learn about different causes and mechanisms of floods
- be acquainted with the concepts of risk, uncertainty and extreme value theory
- become familiar with structural and non-structural flood control measures
- be introduced to a practical example of flood management by means of a case study

Contents
- Hydrology Related to Flood Management
- Deterministic Analysis Modelling
- Flood Frequency Analysis
- Floodplain Hydraulics
- Determination of Flood Inundation Areas
- Structural and Non-Structural Flood Control Measures
- Flood Management Case Study

River Basin Management
(3 ec; H. Weyand/NN (Ruhrverband, Essen), Dr. P. Podraza, PD Dr. D. Hering)

Learning Targets
The students
- gain insight in responsibilities and targets in river basin management planning (depending on administration and stakeholders involved)
- know different strategies to assess and weigh up competing demands in water management

Contents
River basin characteristics, human pressure analysis, measure scenarios ("best practice"), public participation, monitoring, transboundary basins, administrative competencies in river basin management.

Environmental Management
(2 ec; Dr. Anette von Ahsen)

Learning Targets
The students
- understand the economic principles for environmental management
- are able to apply economical evaluation

Contents
Environmental management systems in companies, environmental management instruments, such as Material- and energy-Flow Analysis, Life Cycle Assessment, monetary (willing to pay, WTP) and nonmonetary forms, methods for integrated monetary (CBA) and nonmonetary decision making (MCA).

5 Practical training

5.1 Traineeship Environmental Sciences in general

The master programme starts with several courses. Upon completing these, you will proceed to conduct research in environmental sciences.
Most of the research traineeships take place at the departments of the Faculty of Science or the Faculty of Medical Science. It is also possible to do a research traineeship elsewhere. External traineeships often concern research institutions, organisations or companies (for example, RIVM, Alterra, consultancies, KEMA, ANDENO) with which the departments of the Faculty of Science maintain contacts.

In addition to a daily supervisor during the external traineeship, the student will also be appointed a supervisor at the faculty for the purpose of monitoring the progress and quality of the research traineeship. External traineeships often go hand in hand with separate traineeship agreements in which certain arrangements are made concerning supervision, responsibilities, products and traineeship allowances.

If you find it difficult to choose, then you can opt to set up an appointment with the educational advisor in order to discuss matters. You can also call upon the contact persons of the various departments for additional information concerning the research traineeships that they offer. It is important that you realise that the subjects mentioned are not exhaustive. It is often possible to propose a subject of your own, provided that it is in line with the research that is conducted at the department concerned.

The majority of the departments requires that you apply for a research traineeship at least 1 month before and no earlier than six months before the start of the traineeship. You can register for a traineeship at the secretarial office of the department concerned or through one of the permanent staff members of the department.

5.2 Traineeship abroad

The Department of Environmental Science has various partners around Europe that participate in the exchange of MSc-students for a period of three to six months, often within the European Socrates programme. Students are are eligible for scholarships that cover travel and accomodation expenses. There are special relationships with, e.g., Lissabon (Portugal), Lublin (Poland) as well as with several institutes in Indonesia, Tanzania and Curaçao. In addition, staff member have their own contacts that can be used for specific topics.

For more information you can contact Mark Huijbregts (T: 024-3652835; e-mail: m.huijbregts@science.ru.nl) or Marlie Becks (T:024-3653285; e-mail: m.becks@science.ru.nl).

5.3 Research Environmental Specialism

The traineeships in an environmental specialism are at Departments of the Faculty of Science or the Faculty of Medical Science. These departments are responsible for the topics of research.

Guidelines traineeship environmental specialism

Guidelines traineeship environmental specialism
The following guidelines apply to every traineeship regarding an environmental specialism:

- The traineeship is to correspond to a total of 30-45 credits (approx. 6 or 9 months).
- The traineeship is to be evaluated in the form of 2 final marks, namely:
  - a mark for the practical work and the report (corresponding to 24 credits or 39 credits) and
  - a mark for the theoretical component. This may concern a lecture, a thesis or an exam of your knowledge of a particular book(s). This component corresponds to 6 credits in each case and is to be evaluated by the responsible teacher.
- A traineeship is to essentially be carried out under the responsibility of a staff member with a teaching commitment at the Faculty of Science or the Faculty of Medical Sciences of the RU.
- The traineeship is to concern the identification and/or analysis and/or solving of environmental problems from a disciplinary angle, namely a biological, chemical and/or physical environment specialism.
- The nature of the theoretical component is to concern an environment specialism as well.
- The subject of the traineeship is to be submitted to the examining board prior to starting the traineeship.
- The subject of the traineeships is to be presented to the contacts of the various environment specialistic departments. The examining board will reach a decision after having consulted with these persons.

Aim of the environmental specialism research traineeship

- The student can independently set up and conduct scientific, environment specialistic research
- The student has environment specialistic knowledge of one or various subsectors
- The student is able to report and to communicate the results of the environment specialistic research in a clear fashion
- Specific goals that are formulated from an environment specialistic angle

Themes
Presentation of environment specialistic issues and research results. Subsequent themes that are to be formulated from an environment specialistic angle.

Form of training
Practical work, including reporting, progress discussion, other components as these are required by the responsible department, such as a lecture or thesis.

Maintenance
The responsibility lies with the departments of the Faculty of Science and the Faculty of Medical Sciences.

Literature
To be determined by the responsible departments.

Topics for research research work in environmental specialism

The departments below participate in the academic training and provide environment-oriented research traineeships with respect to the subjects described below. In addition, you may also do a traineeship at the other departments that make up the Faculty of Science or the Faculty of Medical Sciences if department concerned agrees to this and the nature of the subject of the research traineeship concerns environmental sciences. The examining board of Environmental Sciences must at all times approve these options. The list below is therefore not exhaustive.

Department of Aquatic Ecology Environmental Biology (contact person: Prof.dr. J.G.M. Roelofs):

The main topics of the department are within the field of restoration ecology and climat ecology. Current projects include research on wet and dry forests, heathlands, peat bogs, minerotrophic peatlands, dune slacks, river floodplains, soft water ecosystems and chalk grasslands. The main aim is to determine the biogeochemical and biological key factors and key processes related to climate change and other anthropogenic changes, knowledge of which is vital for the restoration of (heavily) disturbed ecosystems.

Climate change:
1. Effects of increased C02 concentrations on C-limited lakes in Europe;
2. Reconstructing the Mid Eocene climate; an actuo study of *Azolla.*

Restoration:
1. Restoration of fens and marshes;
2. Restoration of zinc-related vegetation types;
3. Restoration of alder carrs in former river meanders;
4. Restoration of raised bogs;
5. Rehabilitation of nature on former agricultural areas.

Eutrophication:
1. Biogeochemistry and internal eutrophication in freshwater wetlands;
2. Reversibility of nitrogen saturation in forest ecosystems;
3. Liming of acidified Norwegian lakes: effects on water quality and vegetation.

Ecotoxicology:
1. Heavy metal pollution in river Pilcomayo, Bolivia: effects on fish communities and food webs;
2. Sulphide toxicity to freshwater wetland plants and soil macrofauna;
3. Aluminum and ammonium toxicity in terrestrial and aquatic plant species.

For more information see: www.eco.science.ru.nl/mibiol/mibio.htm

Department of Microbiology, IWWR (contact person : dr. Huub J.M. Op den Camp):

The research of the department of Microbiology is focused on freshwater ecosystems with major emphasis on biodiversity and activity of microorganisms in their natural habitat. How do bacteria adapt to their environment? Do their activities differ in time and place? Our interest is

directed towards the hyperdynamic oxic/anoxic boundary between sediment and water. Besides ecological aspects, we also study the physiology and biochemistry of relevant trophic groups of bacteria. So research activities go from sub-cellular to organism and population levels. Within our research many topics are related to environmental questions. This is illustrated in the following projects:

- Removal of volatile sulfur compounds from waste gas: isolation of specialized microorganisms and their application in biotrickling filters.
- Removal of nitrogen compounds from wastewater: the population dynamics of nitrifiers, denitrifiers and anaerobic ammonium oxidizing bacteria (anammox) are studied using 16S rRNA gene analyses and fluorescent probes (FISH).
- Methane oxidation in peatlands. The production and degradation of methane in wetland ecosystems determine the flux of this greenhouse gas to the atmosphere.

For more information look at the Web-site of the department at www.science.ru.nl

Department of Organic Chemistry (contact person: prof. dr. R.J.M. Nolte):

- Study of (bio)catalytic processes, reduction of process waste.
- Process optimization in microreactors, reduction of undesired side products.
- Development of environmentally friendly catalytic (oxidation) processes.

Department of Applied Material Science (contact person: dr. P.R. Hageman):

- Classical III-V semiconductors for high efficiency solar cells *(Dr.ir. J.J. Schermer)*
  Goal of research: Research activities within this topic aim to increase the efficiency of III-V solar cells by the development of a monolithic InGaP/GaAs tandem cell, which utilises the solar spectrum much better than a single junction solar cell. In this respect one of the most important goals is to develop thermally stable tunnel junctions as optically transparent, low resistivity interdevice ohmic contact between the InGaP and the GaAs cells in the tandem structure. Parallel to the research on efficiency increase, studies are performed to reduce the amount of material (thus costs) presently used by the production of high-efficiency III-V solar cells.

- Wide bandgap GaN sunstrates for high power optical devices (*Dr. P.R. Hageman)*
  Goal of research: In many application areas, for instance those related to optical storage, projectors, and lighting operating at high power levels, the replacement of incandescent light bulbs by solid state devices will have many advantages. Higher intensity, much longer lifetime, shorter wavelengths, higher storage capacity, reduced power consumption, are to be expected. This motivates the very large interest the III-nitride system (AlGaInN), which is very promising because of its excellent material properties, especially its high, direct, and tunable bandgap. These GaN based solid state devices are preferably deposited on GaN substrates. However, these are currently not commercially available and alternatively, non-lattice matched substrates like sapphire are employed which reduce the efficiency of blue lasers and GaN based electronics considerably. The research is directed at the development of these GaN substrates. Not only the deposition of thick GaN layers but also the development and modelling of suitable reactors is studied.

For more information look at the Web-site of the department: www.ru.nl/AMS

Department of Molecule and Laser Physics (contact person: Dr. Frans J.M. Harren)

The applied spectroscopy is used for the detection of trace gases under atmospheric conditions. For this, advanced high power lasers are used in combination with various spectroscopic techniques. The research is focused on the development of new techniques to widen the amount of applications in:

- Research on trace gases emitted into the atmosphere from biological and/or anthropogenic sources
- Research on combustion processes to reduce the exhaust from Diesel engines
- Atmospheric research on the influence of aerosols on the Earths' radiation budget

To enter the department as undergraduate Master student it is advisable to attend the course Atom and Molecular Physics (6 ec).

Do you like to know more about the research at the department please contact us or visit our website: www.science.ru.nl/mlf

Department of Epidemiology and Biostatistics (contact person: dr. P.T.J. Scheepers)

This research programme uses toxicological expertise for improvement of epidemiological studies by use of biological monitoring. Chemical markers (biomarkers) are being developed for exposure, susceptibility, and effect characterisation of carcinogenic and reprotoxic substances.

Most of this work is carried out at the Research Lab Molecular Epidemiology (RLME) and is focused on the determination of metabolites and addition products (adducts). Adducts are formed through covalent binding of exogenous compounds with DNA or proteins. The identity of these products is characterized using mass spectrometry. Next, the method of quantification is improved and validated in field studies.

More information can be obtained at: ebp-umcn.org/dept/home.htm

5.4 Research Environmental Science

Research Department of Environmental Science

You will be supervised by a staff member of the Department of Environmental Science. Students are requested to contact the department 6 months before the start of their major, to allow for an adequate planning of the supervision. The intake consists of registration at the secretarial office and an interview with the coordinator (Mark Huijbregts) who will help to select a subject that meets the interest and education profile of the student.

Duration 30 or 45 ec (= 6 or 9 months)

After completing a student should be able to:

- design, organize and carry out research in the field of environmental science
- contribute to analyses and solutions of environmental issues in a innovative way
- apply environmental research methods for the analysis of environmental issues

- collect, select and integrate data into environmental concepts
- derive recommandations for environmental management from results of research
- report and communicate the results to target groups in science and society

Research themes at the Department of Environmental Science

We aim to understand and predict biological responses to physical and chemical pressures. Our research focus is on the impact of reconstruction and pollution on plant, animal and human populations in the rivers and estuaries of the Rhine and Meuse basin. We build and apply conceptual and mathematical models in cooperation with laboratory and field experts. Our students are trained to become professionals in research, management and consultancy on environmental, nature and water issues. As we are both interested in and dedicated to environmental problems, we develop scientific knowledge and implement it in society.

Focus 1: Reconstruction and pollution in the Rhine-Meuse basin

Western Europe in general, and the Rhine and Meuse delta in particular, have changed dramatically in the last centuries. In the past, this area consisted of natural wetlands with rivers that transported water freely from the land to the sea. Nowadays, land is intensively cultivated, heavily industrialized, densely populated, and consequently protected against flooding by dikes and dams. As a result of land use changes and high water levels, possibly enforced by climate changes in the future, the whole basin is under reconstruction. Dikes are raised and moved, summer and winter beds are excavated, obstacles are removed and emergency spillways are created. Reconstruction changes the flow of water and the level and type of the substrate altering the species composition and ecosystem functioning. Emissions of toxicants and nutrients from agriculture, industry and households cause pollution of water, sediment and air, leading to concentrations that affect plants, animals and man. Traditional pollutants are banned but new, largely unknown, chemicals are used and released instead.

Nijmegen is located at a narrow of the rivers Rhine and Meuse, between the large German and Belgian catchments areas and the Dutch delta.
As a consequence, problems throughout the whole basin are magnified in the vicinity of Nijmegen, giving good opportunities for research and education. Transitions between dry and wet, fresh and salt, pristine and heavily modified systems are nearby for detailed case studies. Students find a broad set of environmental, nature and water issues to learn from.

Focus 2: Conceptual and mathematical models to integrate fragmented data from lab and field studies

While the above-mentioned problems are inherently complex, information needed to derive solutions is scattered. Data are collected by various disciplines, in laboratory experiments and field surveys, carried out at different conditions, measuring different physical-chemical pressures and biological responses. To allow diagnosis and prognosis, coherent frameworks are indispensible. We therefore focus on the development and application of conceptual and mathematical models and databases that allow scattered information to become consistent knowledge, qualitative judgements to be replaced by quantitative assessments, causes to be linked mechanistically to consequences and understanding to be followed by predicting.

The models are in between an exact and an abstract description of reality. They should be sufficiently abstract to allow application to many cases and at the same time allow calibration and validation with data. The data needed are often collected in collaboration with other

departments and organizations. In research, it allows modelling, laboratory and field experts to help each other. In education, students get the opportunity to link their own case studies to issues that they will have to deal with in their working life later. Examples of these models include BIOSAFE, USES-LCA and OMEGA.

Focus 3: Applied research from science to management

We are both curious about and committed to environmental problems. Our efforts are therefore not only directed to developing scientific knowledge. We collaborate closely with organizations for environmental, nature and water management in the field of both physical and social sciences (see partners). In our assessment of environmental and ecological indicators, we include society-oriented aspects such as the perception of nature by people and the restrictions imposed by EU-directives. So far, management has been able to solve easy problems by reacting afterwards. Our models will help to anticipate and solve problems of a more complex nature.

Our research is centered on the following fields:

- rivers
- estuaries
- bogs and lakes
- risk assessment
- life cycle assessment

Recent topics for a MSc thesis include:

- Ecological rehabilitation of the Dutch river area: role and significance of some fauna species
- Historic-geographic overview of hydraulic reconstruction in the Dutch river area: a GIS approach
- The historic relationship between agriculture/hunting/fishing - nature in the Dutch river area
- Analysis of ecological characteristics in of BIO-SAFE species
- Ecological references for urban water systems
- History of excavations in the Dutch river area
- Relationships between environmental factors, vegetation and fauna in urban water systems
- Aquatic microphytes between fresh and salt water
- Coupling of hydromorfological and chemical stress to ecological response and human risk with the use of meta-analysis and simple models
- Ecological risks of dredging
- SimpleBox version 4.0 - Improvement of the oceanic compartiment
- Adsorption of contaminants in groundwater with low sand and high organic content
- Reduction of ecological risks as a result of the dredging of contaminated sediment?
- Effect modelling of metals in the aquatic environment
- Effect of extreme drought on water quality and possible consequences for drinking water supplies
- Quality of sewage treatment effluents in relation to pesticides and priority substances: impact on water systems and drinking water supply

For an actual and detailed overview of topics for traineeships at Environmental Sciences we refer to www.ru.nl/environmentalscience/education/student_research/master/

Education and research methods
- studies: literature, modelling, lab or field (often in cooperation with other departments)
- written communication: report, publication, poster, web-site, press release
- oral communication: presentation, lecture, meetings

External traineeships are laid down in a contract with agreements on supervision, allowances for expenses, insurance etc.

Additional information can be obtained from
Mark Huijbregts: +31 (0)24 36 52 835, m.huijbregts@science.ru.nl
Marlie Becks: +31 (0)24 36 53 285, m.becks@science.ru.nl

6 Annual schedule 2007-2008

6.1 Annual schedule 2007-2008

The academic year and the academic training courses start on September 3, 2007.

The following holidays will be observed during the academic year of 2007-2008:
- Autumn break is not scheduled in the master's programme!
- Christmas holiday: 24-12-2007 through 4-1-2008
- Spring break: 4-2 through 8-2-2008
- Good Friday: 21-3-2008
- Easter Monday : 24-3-2008
- May break: 28-4 through ma 5-5-2008
- Ascension: 1-5-2008
- Day after Ascension Day: 2-5-2008
- Whit Monday: 12-5-2007
- Foundation day celebration: Thursday 15-5-2008
- Summer holiday: 14-7-2008 through Friday 29-8-2008

The schedules of the courses can be found in full on the website of BioSciences:
www.ru.nl/biowetenschappen/onderwijs/roosters

7 Appendices

7.1 Composition of committees

The members of the examining board of the academic programme of Environmental Sciences

- Dr. R.S.E.W Leuven (chairman)
  T: 024-3652096
  e-mail: r.leuven@science.ru.nl
- Ms. drs. H.J.W. Becks (secretary)
  T: 024-3653285
  e-mail: m.becks@science.ru.nl
- Prof. Dr. T. Gerats
- Dr. M.A.J. Huijbregts
- Dr. A.M.J. Ragas
- Prof. dr. A.J.M. Smits
- Dr. H.R.M.J. Wehrens

The programme committee of Environmental Sciences forms one team together with the programme committee of Biology and is named the programme committee BioSciences.

The participants of Environmental Sciences are:
- Dr. H.J.R. Lenders
  T: 024-3652096
  e-mail: r.lenders@science.ru.nl
- Prof. dr. A.J. Hendriks
  T: 024-3652932
  e-mail: A.J.Hendriks@science.ru.nl

Two student members:
- Merit van den Berg
- Jan Fliervoet
  General e-mail address: olc.mnw@student.ru.nl
  Info studentsite: www.student.ru.nl/olc.biologie

7.2 Honours programme

For students with a broad view of the world

The Honours Programme of the RU Nijmegen will start again in the academic year 2006-2007. With this programme, the Radboud University Nijmegen offers students from every training programme the opportunity to have a look beyond the boundaries of their own field of study in a structured fashion and under intensive supervision. The idea is not to superficially study a randomly chosen subject, but rather to independently examine significant scientific, cultural and philosophical themes with an open-minded and broad view, without letting yourself be limited in advance by the perspective of your own scientific field.

Who can participate?

The Honours Programme is intended for all of the students of the RU Nijmegen who have completed their foundation course and who are extra motivated to acquire a broad outlook in a manner that is not without obligations. There are no costs involved in participating. The programme is not part of the regular training programmes of the faculties.

The students who apply will be offered a prestigious programme that will prove to be an added value in the course of their further studies and career.

A prestigious programme

The courses are provided by top-class teachers of the faculties of the RU Nijmegen. During their courses, they often include guest speakers from other sciences and, in some cases, reputable speakers from social or cultural fields as well. The number of participants per course is generally limited to a maximum of 25 students. And so the students are provided intensive and personal supervision.
Workshops, study weekends, excursions and working visits will make up part of the programme as well, if such is useful for the study of the themes. It goes without saying that a lot of attention will be paid to the quality of the course aids that will be made available to the students free of charge.

A prestigious programme also means that active studying and involvement is expected of the students who participate. The total scope of the Honours Programme is around 600 hours, which are divided between four courses (one course per semester). Of course, it is possible to take more than two years to complete the programme in the event of a traineeship abroad or some other valid reason. It is explicitly expected that the students who begin with the programme do actually complete it.

The courses generally take place on Tuesday or Wednesday evening during the academic year from 18.00h until not later than 21.00h in the Aula-Conference Hall. The students will be offered sandwiches during the break.

Composition of your choice

The student is offered various courses per semester. You are free to choose what you prefer. This will allow you to determine for yourself what you want to focus on in your personal version of the Honours Programme. For the sake of coherence, it is sometimes desirable to take some of the courses that are scheduled in successive periods in the order as proposed. But you can also include these courses in your own personal Honours Programme as separate components. Of course, if you would like advice concerning the composition of your Honours Programme, then you can always call upon the programme instructor who, if desired, can put you in contact with the teachers who are to give a course in the semesters to come.

Tests

Each course is completed with a test. The educational goals and the method of testing are both explained in the comprehensive description of the courses. These are available at the Honours Programme department. The student is obligated to be present during the lectures and to participate in the workshops and excursions. The Honours Programme department keeps a record of the attendance lists and the test results. You will have completed the Honours Programme upon successfully completing four tests.

Honours degree

If you complete the Honours Programme, then you will receive a special Honours degree from the rector during an official academic ceremony stating the nature and the number of credits of the programme. The university will propagate the major significance that it attaches to the Honours Programme to grant-issuing authorities in the Netherlands and abroad. Moreover, students who obtain their Honours degree can apply for a letter of recommendation from the rector at the Honours Programme department for the purpose of arranging a traineeship at a foreign university, for example.

More information

If you would like more information regarding the Honours Programme, the courses and how to apply, then contact the Honours Programme department that is located in the Gymnasion, third floor, room number N.03.110A. The desk is open on Tuesday and Thursday morning from 9.00h until 13.00h and on Wednesday from 9.00h until 17.00h. Much information is available on www.ru.nl/honoursprogramma. Of course, you can also call or e-mail:

Honours Programme Department
024-3615955
mailto:honours@let.ru.nl

7.3 Rules and guidelines of the master

Rules and guidelines of the Examination Board regarding the Education and Examination Regulation (abbreviation in Dutch: OER) Bachelor Biology and Environmental Sciences and the Education and Examination Regulations Master Biology, Master Medical Biology and Master Environmental Sciences 2007-2008

Component: guidelines concerning evaluations and decisions

article A.1 Fraud

a. If, during an examination, one of the observers suspects fraud or irregularities, then he/she is to inform the examinee concerned that such is the case. The examinee, at the request of the observer in question, is obligated to hand over pieces of evidence either immediately or at the end of the examination period. A refusal on the part of the examinee will be considered fraud.
b. An official report is to be made of the supposed fraud as referred to under section a, this under the responsibility of an observer from the faculty concerned.
c. The examination board, after hearing both the observer and the examinee, may opt to declare the (preliminary) examination invalid and moreover, the board may decide to exclude the examinee in question from participation in the next respective (preliminary) examination.
d. In the event that the evaluating university teacher suspects fraud, plagiarism or other irregularities upon marking a written paper, then he/she is to inform the student concerned that such is the case.
e. Fraud with respect to the writing of a paper in some form or other (such as a thesis, lecture or article) is understood to mean the copying, either completely or for the most part, of a paper (either published or not) by someone else, either by electronical means or otherwise.
f. Plagiarism upon writing a paper in some form or other (such as a thesis, article or lecture) is

understood to mean the copying of texts that have been produced by someone else without adequately stating the source.
g. Fraud with respect to writing papers in some form or other (such as theses, lectures or articles), as well as plagiarism, can be punished by means of imposing the obligation to write a new paper on a subject as specified by the responsible professor.

article A.2 Evaluation result examination component

The result of each of the components of the examination as referred to in the Education and Examination Regulation is to be evaluated by the Examination board, insofar as it has not appointed one or more examiners from its midst to that end. The examination board, or an examiner that has been appointed by the board, may consider the results of the corresponding practical assignments and papers in the evaluation of a component. The various parts of a component are weighed as follows:

A 2.1. Practical

1. In addition to training in the form of lectures, seminars, verbal presentations and home study, the examination components may include a (computer) practical. In determining the final mark for the examination component, the examinee's mark for the (computer) practical must be weighed proportionate to the number of ec. A pre-condition in this respect is that the student must obtain at least a 5.5 mark for the practical and at least a 5.0 for the theoretical (preliminary) examination.

2.In the event that the theoretical knowledge behind the (COO-) practical experiments or the knowledge gained during PGO projects is incorporated as part of the (preliminary) theory examination, then the time invested in these forms of education will be recognised as part of the examination mark. It is then no longer necessary to have more than 15% of the mark for the practical contribute to the final mark for the training course. In that case, the student must obtain a pass mark for both the (COO-) practical or the pgo projects, as well as for the (preliminary) theory exam.

3. In the event that the theoretical knowledge behind the (COO-) practical experiments or the knowledge gained during PGO projects is not incorporated as part of the (preliminary) theory examination, because not all students do the same experiments for example, one could consider to have the proportion of the mark for the practical in the final mark equal the relative study load of the practical - for example, the proportion of the mark for the practical should be 25% with respect to a 4 ec course combined with a 1 ec practical. A pass mark must be obtained for both the (preliminary) theory examination as well as for the practical - and so an unsatisfactory mark for the theory examination cannot be compensated for with a high mark for the practical.

article A.3 Multiple evaluation result examination component

In the event that the results of one and the same component are evaluated by more than one examiner, either simultaneously or otherwise, then the Examination board will supervise that the examiners make their evaluation, as much as possible, on the basis of the same standards.

article A.4 Statement of the result

After a (preliminary) examination has been completed, the Examination board or the examiner as appointed by the board will issue a statement (hereinafter called: statement of the result) via the students administration/examination department indicating the result.

article A.5 Consideration result examination component in the event of unsatisfactory mark

In the event that a student takes a (preliminary) examination more than once without obtaining a satisfactory mark, then the Examination board, upon determining the result, will only consider the statement of the result that indicates the highest mark obtained.

If, for example, you score a 5 for an examination and then a 4 for the re-examination, then the 5 will apply. Of course, you will still have to obtain a satisfactory mark upon taking the next re-examination.

article A.6 Consideration result examination component regarding satisfactory mark

Once an examinee has obtained a satisfactory mark or higher for a certain examination component, he/she has the right to take the examination one more time. In such cases, the Examination board will then recognise the most favourable statement of the result.

article A.7 Notice and recommendation

The examinee and/or examined person can request that the Examination board or the examiner, before making a decision with respect to the person concerned, give the supervisor or the student advisor the opportunity to provide the Examination board with information and recommendations.

You can contact the supervisor if you have problems with a preliminary examination with the request to consider the problem in more detail and to advise the Examination board to that end.

article A.8 Determining the result of the examination

1.Once all of the components of an examination have been completed, the Examination board will proceed to determine the result of the examination.

2. The Examination board meets at least twice a year for the purpose of determining the results of examinations. At least two members of the board, along with the chairman or acting chairman, must be present at these meetings. It is also possible to determine the result of an examination by means of a procedure in writing. The judgement of the chairman or acting chairman and at least two members will be required in such cases as well.

3.The Examination board comes to its decisions on the basis of an overview of all of the study results of the person examined as this has been drawn up by the faculty department, meaning the issued statements of the result pertaining to the components that the examinee has taken.

4. The Examination board comes to decisions with a simple majority of votes. The person examined has passed if the required majority is obtained. The person examined will not pass if this majority is not obtained.

article A.9 Final evaluation examination components

The final evaluation, expressed as a number, for each of the examination components is to be indicated in the form of a round number or as 0.5, with the exception that evaluations between 5 and 5.5 will be rounded off to 5.0 and evaluations between 5.5 to 6 will be rounded off to 6.0.

Some examination components may be evaluated with 'fulfilled' or 'unfulfilled' instead of in the form of a number.

article A.10 Re-examination regulation

1. A maximum of three examinations may be taken for each examination component (meaning two re-examinations), this in accordance with the regulation of the Faculty of Natural Sciences. If a student wishes to take part in a fourth (preliminary) examination, then he/she must request the permission of the Examination board in writing, stating the reasons, at least three months prior to the date of the examination concerned. The Examination board, in consultation with the teacher concerned, may stipulate specific conditions with respect participating in the examination, such as taking certain components of the course concerned once again. The Examination board will not, in general, lend permission to participate for a fifth time in a (preliminary) examination concerning a component of the foundation course.

2. In general, there are two (preliminary) examinations per examination component per year; one following the completion of the (training) course concerned and then a re-examination.

3. Under no circumstances may a teacher grant exemption from an examination component, nor may he/she provide recommendations that are inconsistent with the registration regulation as observed by the Faculty.

4. The student has the right of appeal to the faculty of Natural Sciences in the event that the Examination board rejects the student's request.

5. As a rule, verbal examinations do not make up part of any educational programme, this due to the multi-disciplinary nature of the examination components. Requests to that end are to be submitted in writing, stating the reasons, to the Examination board, which may call upon the teacher(s) concerned or an advisor (a medical advisor, for example) for advice on the matter.

6. The examination board is to reach a decision in all cases for which this regulation does not provide.

article A.11 Regulation for qualification for the foundation course examination.

1.The person examined will be considered to have passed the foundation course examination Biology if all of the statements of the result, except for one, pertaining to the components as

specified in article 2 of the Education and Examination regulation, insofar as these apply to the candidate in question, are at least 'satisfactory' (rounded off to 6.0 or higher).

2. Contrary to that stated above, the list of marks regarding the foundation course examination may include one 5.0, provided that this mark is compensated for by at least one mark of eight or higher for a course of the same credits or more credits.

3. The examinee for the foundation course examination Biology will in all other cases be considered not to have passed.

4. The Examination board recognises the following classifications:
a. 'with pleasure (bene meritum)'; in the event that all of the components have been evaluated at, on average, at least a 7.
b. 'with honour (cum laude)'; in the event that all of the components have been evaluated at, on average, at least a 7.5.
c. 'with the highest honour (summa cum laude)'; in the event that all of the examination components are evaluated at, on average, at least an 8.,
d. Each of these classifications will be reduced to a lower classification for every 5.0 on the list of marks.

5. The examination components for which the results are not expressed in numbers (but by means of 'fulfilled') are not considered upon ascribing these classifications.

article A.12 Regulation for qualification for the bachelor examination

1. The person examined is considered to have passed the bachelor examination Biology if he/she has passed the foundation examination Biology and if the statements of the result pertaining to all of the components of the post-foundation phase are at 'satisfactory' (rounded off to 6.0 or more).

2. The examinee for the bachelor examination Biology will be considered not to have passed in all other cases.

3. The Examination board recognises the following classifications:
a. 'with pleasure (bene meritum)'; in the event that all of the examination components have been evaluated at, on average, at least a 7.
b. 'with honour (cum laude)'; in the event that all of the examination components have been evaluated at, on average, at least a 7.5.
c. 'with the highest honour (summa cum laude)'; in the event that the examination components have been evaluated at, on average, at least an 8.
d. Each of the classifications will be reduced to a lower classification for every 5.0 on the list.

4. The examination components for which the results are not expressed in numbers (but by means of 'fulfilled') are not considered upon ascribing these classifications.

article A.13. Master examination

Students are allowed to register for the Master examination if a satisfactory mark has been obtained for all of the components. An exception to this rule concerns the examination date of August 31st. Registration prior to this date is allowed even though the student still awaits the result of one course or mark. The marks concerned must be made known at the latest on the last working day in August (generally Aug 31st).

article A.14 Qualification regulation for the master examination

1. The person examined is considered to have passed the master examination if all of the statements of the result pertaining to the components as specified in article 2.1 of the Education and Examination Regulation, insofar as these apply to the candidate, are at least 'satisfactory' (rounded off to 6.0 or more) and if these examination components are approved by the Examination board (Combination of subjects).

2. The examinee will be considered not to have passed the master/doctoral examination in all other cases.

3. The Examination board recognises and ascribes the classification 'with pleasure (bene meritum)', if:
a. the average evaluation of all of the examination components combined equals at least a 7.0;
and:
b. the evaluation of the practical assignments and reporting of the mandatory traineeships is at least 7.5.

4. The Examination board recognises and ascribes the classification 'with much honour (cum laude)', if:
a. the average evaluation of all of the examination components combined equals at least an 8.0;
b. the evaluation of the practical assignments and reporting pertaining to all of the mandatory traineeships is at least 8.5.

5. The Examination board may furthermore ascribe the classification 'with the highest honour (summa cum laude)', if:
a. the average evaluation of all of the examination components equals at least 9.0;
and:
b. all of the individual traineeships, in terms of practical assignments and reporting, have been evaluated at a mark of at least 9.0.

7. Examination components of which the results are not expressed in the form of a number, but rather in terms of 'fulfilled' for example, are not to be taken into consideration upon ascribing a classification.

article A.15 Unforeseen circumstances

The Examination board is to decide in any and all cases for which these articles do not provide.

Cluster Bio-Sciences, June 2007

7.4 Exam regulations of the master Environmental Sciences 2007-2008 (in Dutch)

Onderwijs- en examenregeling Milieu-Natuurwetenschappen 2007-2008
Masteropleiding

PARAGRAAF 1 ALGEMENE BEPALINGEN

Artikel 1.1 Toepasbaarheid van de regeling

Deze regeling is van toepassing op het onderwijs en de examens van de masteropleiding van de opleiding Milieu-Natuurwetenschappen (MNW); hierna te noemen: de opleiding.
De opleiding wordt verzorgd door het onderwijsinstituut Biowetenschappen binnen de Faculteit der Natuurwetenschappen, Wiskunde en Informatica, verder te noemen de faculteit.

Artikel 1.2 Begripsbepalingen

De in dit reglement voorkomende begrippen hebben, indien die begrippen ook voorkomen in de Wet op het hoger onderwijs en wetenschappelijk onderzoek (WHW) de betekenis die deze wet eraan geeft.

In deze regeling wordt verstaan onder:
a. de wet: de Wet op het Hoger onderwijs en Wetenschappelijk onderzoek afgekort tot WHW en zoals sindsdien gewijzigd;
b. opleiding: de masteropleiding bedoeld in artikel 7.3a, lid 1 onder b van de wet;
c. student: hij of zij die is ingeschreven aan de Radboud Universiteit Nijmegen voor het volgen van het onderwijs en/of het afleggen van de tentamens en de examens van de opleiding;
d. bacheloropleiding:de opleiding, genoemd in artikel 7.3a van de wet;
e. practicum: een praktische oefening als bedoeld in art. 7.13, lid 2 onder d van de wet, in één van de volgende vormen:
• het maken van een scriptie;
• het maken van een werkstuk of een proefontwerp;
• het uitvoeren van een ontwerp- of onderzoekopdracht;
• het verrichten van een literatuurstudie;
• het verrichten van een stage;
• het deelnemen aan veldwerk of een excursie;
• het uitvoeren proeven en experimenten;
• of het deelnemen aan een andere onderwijsactiviteit, die gericht is op het bereiken van bepaalde vaardigheden.
f. tentamen: een onderzoek naar de kennis, het inzicht en de vaardigheden van de student met betrekking tot een bepaalde onderwijseenheid, alsmede de beoordeling van dat onderzoek door minstens één daartoe door de examencommissie aangewezen examinator.
g. examen: toetsing, waarbij door de examencommissie wordt vastgesteld of alle tentamens van alle tot de master behorende onderwijseenheden met goed gevolg zijn afgelegd, voor zover de examencommissie niet heeft bepaald dat het examen tevens omvat een door haar zelf te verrichten onderzoek naar de kennis, inzicht en vaardigheden van de examinandus alsmede de beoordeling van de uitkomsten van dat onderzoek (conform artikel 7.10 van de wet).

h. examencommissie:de examencommissie van een opleiding ingesteld conform artikel 7.12 van de wet. Zie ook Structuurregeling RU.
i. examinator: degene die door de examencommissie wordt aangewezen ten behoeve van het afnemen van tentamens, conform artikel 7.12 van de wet;
j. EC: studiepunten conform het European Credit Transfer System
k. werkdag: maandag t/m vrijdag m.u.v. de erkende feestdagen.
l. studiegids: de gids voor één van de opleidingen genoemd in artikel 1 bevattende de specifieke informatie voor de masteropleiding
m. instelling: Radboud Universiteit Nijmegen.

Artikel 1.3 Doel van de opleiding

Met de opleiding wordt beoogd:
a. kennis, vaardigheid en inzicht te laten verwerven op het gebied van de milieu-natuurwetenschappen
b. studenten een academische vorming te bieden,
c. voor de Onderzoeksvariant (O-variant), aanvullend aan het onder a en b genoemde: voorbereidend op wetenschappelijk onderzoek.
d. voor de management- en toepassingvariant (MT-variant), aanvullend aan het onder a en b genoemde: kennis, vaardigheid en inzicht op relevante terreinen van de bedrijfskunde en bestuurskunde;
e. voor de wetenschapscommunicatievariant (C-variant), aanvullend aan het onder a en b genoemde: kennis, vaardigheid en inzicht op relevante terreinen van de communicatie;
f. voor de educatievariant (E-variant), aanvullend aan het onder a en b genoemde: het verwerven van competenties als docent.

Artikel 1.4 Vorm van de opleiding

De opleiding wordt uitsluitend voltijds verzorgd.

Artikel 1.5 De examens van de opleiding

In de opleiding kan het masterexamen worden afgelegd.

Artikel 1.6 Studielast

1. De studielast wordt uitgedrukt in hele EC punten waarbij 1 EC gelijk staat aan 28 uren studie.

2. Het master-examen heeft een studielast van 120 EC.

Artikel 1.7 Taal

1. Het onderwijs wordt in het Engels gegeven, de tentamens en het examen (de examens) worden afgenomen in het Engels. Het onderwijs van specifieke cursussen kan in het Nederlands worden gegeven indien de herkomst van de studenten geen Engelstalig onderwijs vereist.

2. Voor in het Engels verzorgd onderwijs is de Gedragscode vreemde taal van de RU Nijmegen van toepassing. (zie appendix)

3. Voor deelname aan het in het Engels verzorgde onderwijs en eventueel de tentamens is een voldoende beheersing van het Engels vereist. Aan deze eis is voldaan, als de student:
1. in het bezit is van een diploma voorbereidend wetenschappelijk onderwijs; of
2. in het bezit is van een diploma van voortgezet onderwijs, behaald aan een Engelstalige instelling van voortgezet onderwijs binnen of buiten Nederland; of
3. in het bezit is van een diploma hoger beroepsonderwijs; of
4. in het bezit is van een bachelordiploma behaald aan een Nederlandse universiteit; of
5. een van de onderstaande toetsen heeft afgelegd:
* de TOEFL met een score van 550 of hoger voor de papieren versie;
* de TOEFL met een score van 215 of hoger voor de computer versie;
* de IELTS met een score van 6 of hoger.
De examencommissie kan in voorkomende gevallen beoordelen of een student de Engelse taal in voldoende mate beheerst.

PARAGRAAF 2 DE MASTEROPLEIDING

Artikel 2.1 Samenstelling masteropleiding (O-variant)

De masteropleiding omvat de volgende onderdelen met de daarbij vermelde studielast:

1. Verplichte vakken:

o Environmental Sciences (5 EC)
o Environmental & Ecological modelling (5EC)
o Integrated Environmental Assessment (5 EC)
o Orientation in Environmental Research and Management (5 EC)
o Research skills (3 EC)
o Final assignment (4 EC)

2. Keuze onderdelen:
o keuzevakken met een omvang van 9 EC. De examencommissie stelt jaarlijks per variant een lijst samen met cursussen
o twee milieuwetenschappelijke onderzoeksstages, onder goedkeuring van de examencommissie te kiezen met een minimale omvang van 30 EC uitgevoerd onder de verantwoordelijkheid van een hoogleraar van de faculteit dan wel de Faculteit der Medische Wetenschappen.
o een vrije keuze van 15 EC. De student kan hiervoor, onder goedkeuring van de examencommissie, kiezen uit de onderstaande mogelijkheden of een combinatie van onderstaande mogelijkheden:
1. uitbreiding van een (externe) milieuwetenschappelijke onderzoeksstage tot 45 EC
2. een (beroepsoriënterende) stage van 15 EC
3. andere examenonderdelen op masterniveau.

3. Vrije-keuzeruimte met een minimum omvang van 6 EC (academisch niveau en toetsbaar);

4. Een cursus met een wijsgerig karakter (3 EC) met een verplichte keuze uit:
a. Evolutie en Filosofie
b. Wetenschap en Literatuur
c. Mondiale moraal en duurzame samenleving
d. Philosophy of watermanagement
e. Philosophy of Landscape and nature
f. Evolution and the mind
g. Bio-ethics for Lifescientists

Artikel 2.2 Samenstelling masteropleiding (MT-variant)

1. Opleidingsspecifieke onderdelen met een totale studielast van 54 EC
A. Verplichte vakken:
o Environmental Sciences (5 EC)
o Environmental & Ecological Modelling (5 EC)
o Integrated Environmental Assessment (5 EC)
B. Keuze onderdelen:
o een milieuwetenschappelijk onderzoeksstage met een omvang van 30 EC waarvan de verantwoordelijkheid ligt bij een hoogleraar van de faculteit
C. Vrije keuze:
o een vrije ruimte van 9 EC. De student kan hiervoor, onder goedkeuring van de examencommissie, kiezen uit de onderstaande mogelijkheden of een combinatie van onderstaande mogelijkheden:
1. uitbreiding van een (externe) milieuwetenschappelijke onderzoeksstage
2. een (beroepsoriënterende) stage
3. andere examenonderdelen op masterniveau.

2. Een samenhangend pakket van MT-onderdelen met een totale studielast van 57 EC:
A. verplichte onderdelen:
1. Bedrijf & Maatschappij (5 EC),
2. Organisatiekunde (5 EC),
3. Innovatiemanagement (5 EC),
4. Strategie & Marketing (5 EC)
5. Financieel economisch management (5 EC)
B. een MT-keuzevakken (5 EC) te kiezen uit:
o Kennis en ondernemerschap (3 EC)
o Research strategie en management (3 EC)
o Industriële fijnchemie (3 EC)
o Algemene managementvaardigheden (2 EC)
o dan wel een onder goedkeuring van de examencommissie vrij te kiezen vak.
C. een afstudeerproject (27 EC).

3. Vrije-keuzeruimte met een minimum omvang van 6 EC (mist academisch niveau en toetsbaar);

4. Een cursus met een wijsgerig karakter (3 EC) met een verplichte keuze uit:
a. Evolutie en Filosofie
b. Wetenschap en Literatuur
c. Mondiale moraal en duurzame samenleving
d. Philosophy of watermanagement
e. Philosophy of Landscape and nature
f. Evolution and the mind
g. Bio-ethics for Lifescientists

Artikel 2.3 Samenstelling masteropleiding (C-variant)

De masteropleiding C-variant omvat de volgende onderdelen met de daarbij vermelde studielast:

1. Opleidingsspecifieke onderdelen met een totale studielast van 54 EC:
A. Verplichte vakken:
o Environmental Sciences (5 EC)
o Environmental & Ecological Modelling (5 EC)
o Integrated Environmental Assessment (5 EC)
B. Keuze onderdelen:
o een milieuwetenschappelijk onderzoeksstage met een omvang van 30 EC punten waarvan de verantwoordelijkheid ligt bij een hoogleraar van de faculteit.
C. Vrije keuze
o een vrije ruimte van 9 EC. De student kan hiervoor, onder goedkeuring van de examencommissie, kiezen uit de onderstaande mogelijkheden of een combinatie van onderstaande mogelijkheden:
1. uitbreiding van een (externe) milieuwetenschappelijke onderzoeksstage tot 45 EC
2. een (beroepsoriënterende) stage van 15 EC
3. andere examenonderdelen op masterniveau.

2. C-onderdelen met een totale studielast van 57 EC:
A. Verplichte vakken in het eerste jaar :
- Introduction Science Communication (3 ec)
- Science and Societal Interaction (3 ec))
- Risk Communication (3 ec)
- Boundary Work (3 ec)
B. Verplichte vakken in het tweede jaar :
- Framing Knowledge (3 ec)
- Knowledge Society (3 ec)
- Science, Media and Strategy (3 ec)
C. C-Keuzevakken, goed te keuren door de voor de variant verantwoordelijke docent, met een totale studielast van 6 EC
D. Stage en verslaglegging (30 EC)

3. Vrije-keuzeruimte met een minimum omvang van 6 EC (academisch niveau en toetsbaar);

4. Een cursus met een wijsgerig karakter (3 EC) met een verplichte keuze uit:
a. Evolutie en Filosofie
b. Wetenschap en Literatuur
c. Mondiale moraal en duurzame samenleving
d. Philosophy of watermanagement
e. Philosophy of Landscape and nature
f. Evolution and the mind
g. Bio-ethics for Lifescientists

Artikel 2.4 Samenstelling masteropleiding (E-variant)

De masteropleiding E-variant omvat de volgende onderdelen met de daarbij vermelde studielast:

1. Opleidingsspecifieke onderdelen met een totale studielast van 54 EC:
A. Verplichte vakken:
o Environmental Sciences (5 EC)
o Environmental & Ecological Modelling (5EC)
o Integrated Environmental Assessment (5 EC)
B. Keuze onderdelen:
o een milieuwetenschappelijk onderzoeksstage met een omvang van 30 EC waarvan de verantwoordelijkheid ligt bij een hoogleraar van de faculteit.
C. Vrije keuzeruimte:
o De student kan hiervoor, onder goedkeuring van de examencommissie, kiezen uit de onderstaande mogelijkheden of een combinatie van onderstaande mogelijkheden:
1. uitbreiding van een (externe) milieuwetenschappelijke onderzoeksstage
2. een (beroepsoriënterende) stage
3. andere examenonderdelen op masterniveau.

2. E-onderdelen met een totale studielast van 57 EC:
Twee stages met een totale studielast van 57 EC. Deze stages zijn integrale leertrajecten, waarin een continue wisselwerking van theorie, praktijk, intervisie en supervisie plaatsvindt.

3. Vrije-keuzeruimte met een minimum omvang van 6 EC (academisch niveau en toetsbaar);

4. Een cursus met een wijsgerig karakter (3 EC) met een verplichte keuze uit:
a. Evolutie en Filosofie
b. Wetenschap en Literatuur
c. Mondiale moraal en duurzame samenleving
d. Philosophy of watermanagement
e. Philosophy of Landscape and nature
f. Evolution and the mind
g. Bio-ethics for Lifescientists

Artikel 2.5 Differentiatie Transnational ecosystem based Water Management

Voor de richting Transnational ecosystem based Water Management gelden de volgende onderdelen:

1. Verplichte cursussen:
o Orientation in Environmental Research and Management (5 EC)
o Environmental sciences (5 EC)
o Environmental & Ecological Modelling (5 EC)
o Integrated Environmental Assessment (5 EC)
o Methods for Integrated Analysis, Planning and Evaluation (3 EC)
o Principles of Human Agency (4 EC)
o Hydrogeology (2 EC)
o Applied Hydrogeology (4 EC)
o Hydraulics and Sediment Transport (3 EC)
o Ecology and Protection of Freshwater Ecosystems (2 EC)
o Determination Exercises on Aquatic organisms (3 EC)
o Hydrobiological Field Trips (2 EC)
o Water pollution (2 EC)
o Basics in Hydraulic Planning and Facility Design (3 EC)
o Waste Water Treatment (2 EC)
o Flood Management (2 EC)
o River Basin Management (3 EC)
o Environmental Management (2 EC)

2. Keuze onderdelen
o Keuzecursussen met een omvang van 8 EC
o Project van 16 EC
o Master thesis van 30 EC

3. Vrije-keuzeruimte met een minimum omvang van 6 EC (academisch niveau en toetsbaar);

4. Een cursus met een wijsgerig karakter (3 EC) met een verplichte keuze uit:
a. Evolutie en Filosofie
b. Wetenschap en Literatuur
c. Mondiale moraal en duurzame samenleving
d. Philosophy of watermanagement
e. Philosophy of Landscape and nature
f. Evolution and the mind
g. Bio-ethics for Lifescientists

Artikel 2.6 Goedkeuring samenstelling masteropleiding

De door de student gekozen samenstelling van de masteropleiding wordt vooraf ter goedkeuring voorgelegd aan de examencommissie.

Artikel 2.7 Vrije masterexamen

De student heeft de vrijheid om een eigen opleidingspakket samen te stellen (zoals vastgelegd in artikel 7.3.4 van de WHW) waarbij geldt dat dit pakket moet worden goedgekeurd door de examencommissie.

PARAGRAAF 3 TENTAMENS EN EXAMENS VAN DE OPLEIDING

Artikel 3.1 Volgorde van tentamens

1. MT-variant:
Aan de tentamens van de onderdelen Innovatiemanagement en Strategie & Marketing kan niet eerder worden deelgenomen dan nadat de tentamens Bedrijf & Maatschappij en Organisatiekunde zijn behaald.

Het afstudeerproject van de MT-variant kan niet eerder worden verricht dan nadat
• er een voldoende resultaat behaald is voor en/of vrijstelling is verleend van onderdelen van de desbetreffende masteropleiding met een studielast van tenminste 45 EC waaronder de praktische werkzaamheden in het kader van de onderzoekstage van de opleiding;
• een voldoende is behaald voor het merendeel van de vijf MT-basisvakken zoals genoemd in artikel 2.2.

2. C-variant
Het afstudeerproject van de C-variant kan niet eerder worden verricht, nadat:
• er een voldoende resultaat behaald is voor en/of vrijstelling is verleend van onderdelen van de desbetreffende masteropleiding met een studielast van tenminste 45 EC waaronder de praktische werkzaamheden in het kader van de onderzoeksstage van de opleiding ;
• een voldoende is behaald voor het merendeel van de verplichte vakken van de variant zoals genoemd in artikel 2.3.

3. E-variant
De stages van de E-variant kunnen niet eerder worden verricht, nadat:er een voldoende resultaat behaald is voor en/of vrijstelling is verleend van onderdelen van de masteropleiding MNW met een studielast van tenminste 30 EC waaronder de praktische werkzaamheden in het kader van de onderzoeksstage van de opleiding.

4. TWM-variant
Het project en de stage van de TWM-differentiatie kunnen niet eerder worden verricht, nadat er een voldoende resultaat behaald is voor en/of vrijstelling is verleend van onderdelen van de masteropleiding MNW differentiatie TWM met een studielast van tenminste 45 EC.

Artikel 3.2 Tijdvakken en frequentie tentamens

1. Tot het afleggen van de tentamens van de in artikel 2.1 t/m 2.4 genoemde onderdelen wordt tenminste tweemaal per jaar de gelegenheid gegeven, met uitzondering van practica of het praktische gedeelte van onderdelen welke slechts eenmaal per jaar kunnen worden afgelegd. Tentamens worden afgenomen aansluitend aan het onderwijs alsmede gedurende een nader te bepalen periode bij voorkeur direct voor het begin van het volgende studiejaar. De Regeling beperking tentamendeelname is hierbij van toepassing (zie appendix).

2. In afwijking van het bepaalde in het eerste lid wordt tot het afleggen van het tentamen van een onderdeel, waarvan het onderwijs in een bepaald studiejaar niet is gegeven, in dat jaar slechts eenmaal de gelegenheid gegeven.

Artikel 3.3 Vorm van de tentamens

1. De examenonderdelen van de cursussen, genoemd in artikel 2 kunnen op de volgende wijze worden afgelegd:
a. schriftelijk en/of
b. praktische oefening + verslag en/of
c. computerpracticum en/of
d. computertentamen en/of
e. mondelinge presentatie.

2. Op verzoek van de student kan de examencommissie toestaan dat een tentamen op een andere wijze dan vorenbedoeld wordt afgelegd.

3. Aan studenten met een functiestoornis wordt de gelegenheid geboden de tentamens op een zoveel mogelijk aan hun individuele handicap aangepaste wijze af te leggen. De examencommissie wint zo nodig deskundig advies in alvorens te beslissen. Indien de betreffende studenten bij een tentamen bepaalde faciliteiten nodig hebben, dienen zij deze uiterlijk twee weken voor het tentamen bij de docent aan te vragen.

Artikel 3.4 Mondelinge tentamens

1. Mondeling wordt niet meer dan een persoon tegelijk getentamineerd, tenzij de examencommissie anders bepaalt.

2. Het mondeling afnemen van een tentamen is niet openbaar, tenzij de examencommissie of de desbetreffende examinator in een bijzonder geval anders heeft bepaald, dan wel de student daartegen bezwaar heeft gemaakt.

Artikel 3.5 Vaststelling en bekendmaking tentamenuitslag

1. De examinator stelt terstond na het afnemen van een mondeling tentamen de uitslag vast en reikt de student een desbetreffende schriftelijke verklaring uit.

2. De examinator stelt de uitslag van een schriftelijk tentamen vast binnen 30 dagen na de dag waarop het is afgelegd, of zoveel eerder als nodig is om 10 werkdagen voor de herkansingsdatum bekend te zijn, en verschaft de administratie van de faculteit de nodige gegevens ten behoeve van de uitreiking van het bewijsstuk omtrent de uitslag aan de student.

3. Voor een op andere wijze dan mondeling of schriftelijk af te leggen tentamen bepaalt de examencommissie tevoren op welke wijze en binnen welke termijn de student een schriftelijke verklaring omtrent de uitslag zal ontvangen.

4. Op de schriftelijke verklaring omtrent de uitslag van een tentamen wordt de student gewezen op het inzagerecht, bedoeld in artikel 3.7, eerste lid, alsmede op de beroepsmogelijkheid bij het college van beroep voor de examens.

5. De termijn waarop studenten in beroep kunnen gaan bij het College van Beroep voor de Examens tegen een beslissing van de examencommissie is vier weken (zoals vastgelegd in de Structuurregeling RU).

Artikel 3.6 Geldigheidsduur

1. De geldigheidsduur van behaalde examenonderdelen is onbeperkt.

2. In afwijking van het bepaalde in het eerste lid kan de examencommissie voor een onderdeel aanvullende dan wel vervangende eisen stellen, indien naar haar oordeel de eisen met betrekking tot dat onderdeel aanzienlijk afwijken van die, gesteld ten tijde van het afleggen van het tentamen.

Artikel 3.7 Inzagerecht

1. Gedurende tenminste zes weken na de bekendmaking van de uitslag van een schriftelijk tentamen krijgt de student op zijn verzoek inzage in zijn beoordeeld werk. Tevens wordt hem op zijn verzoek tegen kostprijs een kopie verschaft van dat werk.

2. Gedurende de in het eerste lid genoemde termijn kan elke belanghebbende kennis nemen van vragen en opdrachten van het desbetreffende tentamen, alsmede zo mogelijk van de normen aan de hand waarvan de beoordeling heeft plaatsgevonden.

3. De examencommissie kan bepalen, dat de inzage of de kennisneming geschiedt op een vaste plaats en op tenminste twee vaste tijdstippen. Indien de betrokkene aantoont door overmacht verhinderd te zijn of te zijn geweest op een aldus vastgestelde plaats en tijdstip te verschijnen, wordt hem een andere mogelijkheid geboden, zo mogelijk binnen de in het eerste lid genoemde termijn.

Artikel 3.8 Vrijstelling

1. De examencommissie kan de student op diens verzoek, gehoord de desbetreffende examinator, vrijstelling verlenen van een tentamen, indien de student:
• hetzij een qua inhoud en niveau overeenkomstig onderdeel van een universitaire of hogere beroepsopleiding heeft voltooid;
• hetzij aantoont door werk- c.q. beroepservaring over voldoende kennis en vaardigheden te beschikken m.b.t. het desbetreffende onderdeel.

Artikel 3.9 Examen

1. Tot het afleggen van het examen wordt de gelegenheid geboden nadat de student voldoende bewijzen overlegt van door hem behaalde onderdelen van dat examen.
2. De examencommissie stelt de uitslag van het examen vast, alsmede de regelen met betrekking tot de wijze waarop de uitslag van het examen wordt vastgesteld.
3. Alvorens de uitslag van het examen vast te stellen kan de examencommissie zelf een onderzoek instellen naar de kennis van de student met betrekking tot een of meer onderdelen of aspecten van de opleiding, indien en voor zover de uitslagen van de desbetreffende tentamens haar daartoe aanleiding geven.

Artikel 3.10 Graad

1. Aan degene die het masterexamen met goed gevolg heeft afgelegd, wordt de graad "Master of Science" verleend.
2. De verleende graad wordt op het getuigschrift van het examen aangetekend.
3. Aan degene die de O-variant als bedoeld in artikel 2.1 met goed gevolg heeft afgelegd, wordt aan de mastergraad de differentiatie Onderzoek toegevoegd.
4. Aan degene die de MT-variant als bedoeld in artikel 2.2 met goed gevolg heeft afgelegd, wordt aan de mastergraad de differentiatie Management & Toepassing toegevoegd.
5. Aan degene die de C-variant als bedoeld in artikel 2.3 met goed gevolg heeft afgelegd, wordt aan de mastergraad de differentiatie Wetenschapscommunicatie toegevoegd.
6. Aan degene die de E-variant als bedoeld in artikel 2.4 met goed gevolg heeft afgelegd, wordt aan de mastergraad de differentiatie Educatie toegevoegd en wordt door het Instituut voor Leraar en School een eerstegraads docentbevoegdheid verleend.
7. Aan degene die de TWM-variant als bedoeld in artikel 2.5 met goed gevolg heeft afgelegd, wordt aan de mastergraad de differentiatie Transnational Ecosystem based Water Management toegevoegd.

PARAGRAAF 4 VOOROPLEIDING

Artikel 4.1 Toelatingseisen masteropleiding

Tot de opleiding worden, onverlet het bepaalde in artikel 4.3, toegelaten:
a. degene die het afsluitende examen van de bacheloropleiding Milieu-Natuurwetenschappen of Biologie met minor Milieu-Natuurwetenschappen aan de RU met goed gevolg hebben afgelegd.
b. degene die in het bezit zijn van het bewijs van toelating, dat het College van Bestuur voor het desbetreffende studiejaar afgeeft (artikel 4.2).
c. degene die in het bezit is van een bachelordiploma in een andere opleiding of met andere minor (universitair of HBO), mits naar mening van de examencommissie bestaande deficiënties met een schakelprogramma van maximaal 30 EC kunnen worden ingelost, en het daartoe opgestelde schakelprogramma met een voldoende is afgerond.

Artikel 4.2 Bewijs van toelating

Voor het bewijs van toelating komt in aanmerking degene die:
a. in het bezit is van een getuigschrift dat ten minste gelijkwaardig is aan het diploma als bedoeld in artikel 4.1. onder a (en/of b),
b. of anderszins naar het oordeel van de examencommissie blijk hebben gegeven van geschiktheid voor het volgen van de opleiding,
c. en het bewijs heeft geleverd van voldoende beheersing van de Engelse taal, zoals bepaald in artikel 1.7 lid 2 en 3

Artikel 4.3 Flexibele instroom in de master

1. De examencommissie kan, voor zover de beschikbare onderwijscapaciteit dat toelaat, besluiten dat de student die is ingeschreven voor de bacheloropleiding Milieu-Natuurweten-

schappen of Biologie met minor Milieu-Natuurwetenschappen kan worden toegelaten tot de masteropleiding Milieu-Natuurwetenschappen voordat deze met goed gevolg het afsluitende examen van de bacheloropleiding Milieu-Natuurwetenschappen of Biologie met minor Milieu-Natuurwetenschappen heeft afgelegd.

2. Toelating is alleen mogelijk, als de student voldoet aan de volgende voorwaarden:
a. er is voldoende resultaat behaald voor en / of vrijstelling verleend van de onderdelen van het bachelorexamen met een studielast van 162 EC;
b. in afwijking van het bepaalde in lid 2.a geldt voor studenten begonnen op 1 september 2002 dat toelating mogelijk is wanneer er voldoende resultaat is behaald voor en/of vrijstelling verleend van de onderdelen van het bachelorexamen met een studielast van 150 EC;
c. er is voldoende resultaat behaald voor alle onderdelen van het eerste jaar (60 EC) en de bachelor thesis danwel de ministage.

3. De student die krachtens dit artikel is toegelaten tot de opleiding, dient uiterlijk een jaar na die toelating het afsluitend examen van de in het eerste lid bedoelde bacheloropleiding met goed gevolg te hebben afgelegd. Wanneer aan deze voorwaarde niet is voldaan wordt de student uitgesloten van deelname aan tentamens van de opleiding totdat het afsluitend examen van genoemde bacheloropleiding met goed gevolg is afgelegd.

PARAGRAAF 5 STUDIEBEGELEIDING

Artikel 5.1 Studievoortgangadministratie

1. De faculteit registreert de individuele studieresultaten van de studenten.
2. Zij verschaft elke student tenminste eenmaal per jaar een overzicht van de door hem behaalde studieresultaten.

Artikel 5.2 Studiebegeleiding

De opleiding draagt zorg voor de introductie en de studiebegeleiding van de studenten, die voor de opleiding zijn ingeschreven, mede ten behoeve van hun oriëntatie op mogelijke studiewegen in en buiten de opleiding.

PARAGRAAF 6 OVERGANGS- EN SLOTBEPALINGEN

Artikel 6.1 Tentamens en examens voor studenten begonnen voor 1 september 2002

1. Tot 1 september 2008 wordt aan studenten die voor 1 september 2002 begonnen zijn de gelegenheid geboden de tentamens alsmede het doctoraalexamen van de opleiding Milieu-Natuurwetenschappen af te leggen zoals vastgesteld in de OER die in werking trad op 1 september 2001.

2. In bijzondere gevallen kan de examencommissie aan andere studenten dan die bedoeld in het eerste lid, toestemming verlenen tentamens en examens af te leggen volgens de in het eerste lid bedoelde onderwijs- en examenregeling. Het bepaalde in het eerste lid blijft daarbij onverminderd van kracht.

Artikel 6.2 Overstap van ongedeelde opleiding naar bachelor/ master structuur

Een student, als bedoeld in art. 6.1, kan onder de volgende voorwaarden deelnemen aan de opleiding krachtens deze onderwijs- en examenregeling:
a. behaalde studieresultaten kunnen worden gewaardeerd als vrijstelling voor overeenkomstige onderdelen "nieuwe stijl";
b. deelneming staat open voorzover de gefaseerde invoering van het onderwijs en de tentamens volgens deze regeling dat feitelijk toelaten.

Artikel 6.3 Vaststelling OER / Wijzigingen
(NB: zie ook Structuurregeling artikelen 11 en 18 en Reglement UGV en FGV artikel 3.3.1.)

1. Deze regeling en wijzigingen van deze regeling worden door de decaan, na advisering door de opleidingscommissie en na instemming van de FGV bij afzonderlijk besluit vastgesteld.

2. Een wijziging van deze regeling heeft geen betrekking op het lopende studiejaar, tenzij de belangen van de studenten daardoor redelijkerwijs niet worden geschaad.

3. Een wijziging kan voorts niet ten nadele van studenten van invloed zijn op enige andere beslissing, die krachtens deze regeling door de examencommissie is genomen ten aanzien van een student.

Artikel 6.4 Bekendmaking

1. De decaan draagt zorg voor een passende bekendmaking van deze regeling, van de regelen en richtlijnen die door de examencommissie zijn vastgesteld, alsmede van elke wijziging van deze stukken.

2. Elke belangstellende kan op het faculteitsbureau een exemplaar van de in het eerste lid bedoelde stukken verkrijgen.

Artikel 6.5 Inwerkingtreding

Deze regeling treedt in werking op 1 september 2007.
Aldus vastgesteld door de decaan op 26 juni 2007.

Appendix

Gedragscode vreemde taal, als bedoeld in artikel 7.2 sub c WHW (vastgesteld door het College van Bestuur)

Binnen de RU geldt de onderstaande gedragscode
• Artikel 1
Binnen de Radboud Universiteit Nijmegen kan het verzorgen van onderwijs en het afnemen van tentamens en examens in een andere taal dan het Nederlands geschieden indien de specifieke aard, inrichting of kwaliteit van het onderwijs, dan wel de herkomst van de studenten daartoe noodzaakt.

• Artikel 2
Een besluit tot het gebruik van een vreemde taal wordt genomen door de decaan van de desbetreffende faculteit, na advies ingewonnen te hebben van de opleidingscommissie. De decaan neemt daarbij de volgende uitgangspunten in acht:

- De noodzaak van het gebruik van een andere taal dan het Nederlands dient vast te staan;
- Tentamens en examens kunnen op verzoek van de student in het Nederlands worden afgelegd; tentamens en examens van Engelstalige opleidingen worden in het Engels afgelegd, tenzij de examencommissie van de desbetreffende opleiding anders beslist;
- Het gebruik van een vreemde taal mag niet leiden tot verzwaring van de studielast van de opleiding;
- Het anderstalig onderwijs voldoet aan dezelfde kwaliteitseisen als het onderwijs verzorgd in het Nederlands.
• Artikel 3
In de onderwijs- en examenregeling van de opleiding wordt het besluit van de decaan verwerkt.
• Artikel 4
De decaan van de faculteit brengt jaarlijks het College van Bestuur verslag uit van de door hem genomen besluiten.

Opleidingscommissie

Overeenkomstig art. 9.18 WHW is er een opleidingscommissie. Deze commissie heeft tot taak:
a) advies uit te brengen over de onderwijs- en examenregeling,
b) het jaarlijks beoordelen van de uitvoering van de onderwijs- en examenregeling, en
c) het desgevraagd of uit eigen beweging advies uitbrengen aan de onderwijsdirecteur en de decaan over alle aangelegenheden betreffende het onderwijs in de opleiding.

Regeling beperking tentamendeelname

Op alle tentamens van de binnen de faculteit verzorgde opleidingen is onderstaande Regeling beperking tentamendeelname van toepassing. Deze is op 7 januari 2004 vastgesteld door de faculteitsleiding na advies van het Onderwijsmanagementteam.

• Studenten mogen maximaal 3 keer aan een tentamen deelnemen. Studenten zijn verplicht zich voor het tentamen elektronisch aan te melden via KISS tot 5 werkdagen voor het tentamen. De surveillant dient e.e.a. te controleren en bijschrijvingen op de deelnamelijst worden niet toegestaan. De docent mag slechts tentamenopgaven uitreiken aan studenten, die vooraf aangemeld zijn.
• Studenten dienen zich af te melden als ze niet deelnemen aan een tentamen:
• tot 5 werkdagen voor het tentamen in Kiss,
• daarna tot 1 werkdag voor het tentamen wordt afgenomen. Deze afmelding geschiedt uitsluitend schriftelijk/elektronisch bij de docent.
Als een student niet deelneemt zonder zich tijdig te hebben afgemeld, verspeelt hij/zij een tentamenkans (1 van de 3).
• Indien het tentamen na 3 keer nog niet is behaald, dient de student voor iedere volgende keer dat hij/zij aan het tentamen wil deelnemen een schriftelijk verzoek in te dienen bij de examencommissie van zijn/haar opleiding.
• De studentenadministratie is verantwoordelijk voor het registreren van het aantal keren, dat een student heeft deelgenomen aan een tentamen.

• Deze regeling betreft zowel mondelinge als schriftelijke tentamens.
• Deze regeling geldt voor alle studenten van de Faculteit Natuurwetenschappen, Wiskunde en Informatica.
• Indien de student kan aantonen door overmacht verhinderd te zijn geweest deel te nemen aan het tentamen dan wel zich niet tijdig heeft kunnen afmelden, kan de examencommissie besluiten de inschrijving niet als deelname te beschouwen.
• Deze regeling treedt in werking met ingang van 1 februari 2004 voor wat betreft tentamens waarvoor studenten zich na die datum voor de eerste maal inschrijven.

Nadere regels voor de goede gang van zaken tijdens tentamens (ex art. 7.12 lid 4 WHW)

De examencommissie stelt regels vast met betrekking tot de goede gang van zaken tijdens tentamens en met betrekking tot de in dat verband te nemen maatregelen. Die maatregelen kunnen inhouden dat in geval van fraude door een student door de examencommissie, gedurende een door de examencommissie te bepalen termijn van ten hoogste één jaar, aan die student het recht wordt ontnomen een of meer daarbij aan te wijzen tentamens of examens aan de instelling af te leggen.

7.5 List of lecturers

Born, Dr. J.G. van den	r.vandenborn@science.ru.nl	52269	HG 02.814
Dankbaar, Prof. dr. B.	b.dankbaar@fm.ru.nl	52681	HG 02.809
Dankelman, Drs. I.E.M.	i.dankelman@science.ru.nl	52150	HG 02.827
Drenthen, Drs. M.A.M.	m.drenthen@science.ru.nl	52730	HG 02.826
Dresen, H.M.	l.dresen@science.ru.nl	52188	HG 02.831
Groot, Prof. dr. ir. W.T. de	w.degroot@science.ru.nl	52578	HG 02.832
Hendriks, Prof. dr. ir. A.J.	a.j.hendriks@science.ru.nl	52932	HG02.712
Huijbregts, Dr. M.A.J.	m.huijbregts@science.ru.nl	52835	HG02.715
Keulartz, Prof. dr. F.W.J.	j.keulartz@science.ru.nl	52851	HG 02.823
Lekkerkerk, Ir. L.J.	h.lekkerkerk@fm.ru.nl	11931	TvA1 01.35
Lenders, Dr. H.J.R.	r.lenders@science.ru.nl	52623	HG02.709
Leuven, Dr. R.S.E.W.	r.leuven@science.ru.nl	52096	HG02.713
Lindemann, Drs. M.	m.lindemann@science.ru.nl	52429	HG 02.820
Minnaar, Drs. R.A.	r.minnaar@fm.ru.nl	11765	TvA1 02.24
Ragas, Dr. A.M.J.	a.ragas@science.ru.nl	53284	HG02.708
Souren, Dr. A.F.M.M.	a.souren@science.ru.nl	52269	HG 02.814
Vissers, Dr. G.A.N.	g.vissers@science.ru.nl	52686	HG 02.830
Vos, Drs. ing. P.M.	p.vos@fm.ru.nl	13026	02.26
Vugteveen, Drs. P.	p.vugteveen@science.ru.nl	52725	HG02.738
Welters, Drs. R.P.M.M.	r.welters@honours.ru.nl	11354	
Wiering, Dr. M.A.	m.wiering@fm.ru.nl	15567	01.54
Zwart, Prof. dr. H.A.E.	h.zwart@science.ru.nl	52038	HG 02.808

8 List of Courses