Biology MSc

VU University Amsterdam - Fac. der Aard- en Levenswetenschappen - M Biology - 2015-2016

The aim of the programme is to equip the student with the knowledge, skills and understanding required to operate as an independent professional within the disciplines covered by the Master's programme, and to be a suitable candidate for a subsequent career in biological research.

The Master's programme in Biology guarantees its students in-depth research experience with a solid academic basis, combined with the communication skills that are needed to perform at the international level. While the two-year programme is taught in English, some Dutch components are included in the Education specialization.
The student can choose from the following specializations:

Research:
· Brain and Behavior
· Ecology
· Green Life Sciences
· Cell Biology (only applies to students that started 2010-2011 or earlier)

Management, Communication, Education (to be combined with a research specialization):
· Societal specialization (M)
· Communication specialization (C)
· Education specialization (E)
The Societal, Communication and Education specializations are one-year programmes that cannot be combined with each other, and which must be combined with one of the research specializations.

The year schedule can be found at the FALW-website.
Further information about the MSc programme Biology.
A complete programme description can be found at the FALW-website.

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Expired programme components Biology

The course programme components presented in the list below will no longer be part of the examination programme in academic year 2015-2016.

Courses:

Name	Period	Credits	Code
Clinical development and clinical trials	Ac. Year (September)	6.0	AM_470585
Internship Societal Specialisation	Ac. Year (September)	30.0	AM_471147

MSc Biology, Non-Research Specialisation Programmes

Based on the assumption that Master's students following the Communication, Education and Science in Society specializations should also have research experience, the research specialization consists of at least 57 EC and should include a biological research internship.

Programme components:

- Communication Specialisation
- Biology
- MSc BIO Science in Society specialisation
- Master Leraar VHO Biologie 2015

Communication Specialisation

Biology is increasingly becoming an interdisciplinary research field in which biological scientists can no longer function effectively in isolation. Rather, they benefit from interaction with other scientists (such as those in the fields of molecular biology, biotechnology and ecology) and societal actors (such as farmers and policy makers, in the field of ecogenomics). Communication about science takes place between academic peers and between scientists and the general public. This makes the Communication specialization a complex and dynamic field of research and practice. The Master's graduate with this specialization has a theoretical understanding of the complex problems that arise during such communication processes, and has developed the necessary skills to act professionally at this interface to enhance communication and the outcomes of communication between scientific actors and society.
The programme for the Communication specialization has a study load of 54 EC.

Programme components:

- Compulsory courses
- Optional courses: select at least 12EC

Compulsory courses

Students can opt for an internship of 30 credits (EC), or for a combination of an internship of 21 credits and a thesis of 9 credits.

Courses:

Name	Period	Credits	Code
Internship Communication Specialisation		30.0	AM_471148
Science and Communication	Period 1	6.0	AM_470587

Optional courses: select at least 12EC

Courses:

Name	Period	Credits	Code
Communication, Organization and Management	Period 2	6.0	AM_470572
Science in Dialogue	Period 2	6.0	AM_1002
Science Journalism	Period 2	6.0	AM_471014
Science Museology	Period 3	6.0	AM_470590

Biology

The Master's graduate with a specialization in Education obtains a certificate that qualifies the graduate to teach Biology in secondary schools (this is a 'grade one' certificate, i.e. it qualifies the graduate to teach pupils who will sit public exams in the subject). There is strong demand for academically trained teachers in the Netherlands.

The programme for the Education specialization essentially consists of one year of specific teacher training. This 60 EC-programme is taught in Dutch. Note that the Education Specialization is identical to the Master's in 'Leraar Voorbereidend Hoger Onderwijs - Biologie' that can be followed in addition to a research Master's in Biology or the Biomedical Sciences. The programme can be started twice a year, in September and February.
For courses and more information on the Education specialization: www.psy.vu.nl/nl/opleidingen/masteropleidingen/universitaire-lerarenopleiding.

Programme components:

- Master Leraar VHO Biologie 2015
- LVHO Biologie, overgangsregels
- Leraar voorbereidend hoger onderwijs in Biologie verplicht

Master Leraar VHO Biologie 2015

Courses:

Name	Period	Credits	Code
Didactiek 1	Period 1, Period 4	6.0	O_MLDIDAC_1
Didactiek 2	Period 2+3, Period 5+6	6.0	O_MLDIDAC_2
Didactiek 3	Period 4+5+6	9.0	O_MLDIDAC_3
Peergroup 1	Period 1+2+3, Period 4+5+6	0.0	O_MLPEERGR_1
Peergroup 2	Period 3+4+5	0.0	O_MLPEERGR_2
Praktijk 1	Period 1, Period 4	6.0	O_MLPRAK_1
Praktijk 2	Period 2+3, Period 5+6	9.0	O_MLPRAK_2
Praktijk 3	Period 4+5+6	15.0	O_MLPRAK_3
Praktijk onderzoek 1	Period 3, Period 6	3.0	O_MLPROZ_1
Praktijk onderzoek 2	Period 4+5+6	6.0	O_MLPROZ_2

LVHO Biologie, overgangsregels

Courses:

Name	Period	Credits	Code
Educational and Pedagogical Studies I	Period 1+2	6.0	O_MLADEPI
Research I	Period 1+2+3	3.0	O_MLVPOOI
Teaching Methodology Biology I	Period 1+2	3.0	O_MLVDBII
Teaching Practice I	Period 1+2+3	15.0	O_MLPRAKI

Leraar voorbereidend hoger onderwijs in Biologie verplicht

Courses:

Name	Period	Credits	Code
Educational and Pedagogical Studies II	Period 1+2	3.0	O_MLADEPII
Research II	Period 1+2+3	6.0	O_MLVPOOII
Specialisation	Period 2+3	3.0	O_MLVERD
Teaching Methodology Biology II	Period 1+2	6.0	O_MLVDBIII
Teaching Practice II	Period 1+2+3	15.0	O_MLPRAKII

MSc BIO Science in Society specialisation

The Master's graduate with a Science in society specialization combines an academic approach with the skills and competences that will allow him or her to perform scientific research at the interface of the biomedical sciences and society. The specialization aims to develop strategies that contribute to an understanding of complex societal problems and strategies to solve complex societal problems through interdisciplinary research. In addition, the programme analyses the social, economic and ethical aspects of new developments in the biological sciences, so as to assess their implications for society. Master's graduates have the necessary skills to collaborate and communicate with researchers from various scientific disciplines (including but not limited to those in the biological sciences) and societal actors, and the ability to use these academic insights.
The Science in Society specialization has a study load of 54 EC.

Programme components:

- Compulsory courses
- Compulsory choice of at least 6 EC

Compulsory courses

Courses:

Name	Period	Credits	Code
Analysis of Governmental Policy	Period 1	6.0	AM_470571
Communication, Organization and Management	Period 2	6.0	AM_470572
Internship Science in Society	Ac. Year (September)	30.0	AM_1134
Research methods for analyzing complex problems	Period 1	6.0	AM_1182

Compulsory choice of at least 6 EC

Courses:

Name	Period	Credits	Code
Business Management in Health and Life Sciences	Period 2	6.0	AM_470584
Clinical Development and Clinical Trials	Period 3	3.0	AM_1180
Disability and Development	Period 2	6.0	AM_470588
Entrepreneurship in Health and Life Sc.	Period 2	6.0	AM_470575
Epidemiology	Period 3	3.0	AM_1179

Health, Globalisation and Human Rights	Period 2	6.0	AM_470818
Policy, Politics and Participation	Period 2	6.0	AM_470589
Science in Dialogue	Period 2	6.0	AM_1002

Master Leraar VHO Biologie 2015

Courses:

Name	Period	Credits	Code
Didactiek 1	Period 1, Period 4	6.0	O_MLDIDAC_1
Didactiek 2	Period 2+3, Period 5+6	6.0	O_MLDIDAC_2
Didactiek 3	Period 4+5+6	9.0	O_MLDIDAC_3
Peergroup 1	Period 1+2+3, Period 4+5+6	0.0	O_MLPEERGR_1
Peergroup 2	Period 3+4+5	0.0	O_MLPEERGR_2
Praktijk 1	Period 1, Period 4	6.0	O_MLPRAK_1
Praktijk 2	Period 2+3, Period 5+6	9.0	O_MLPRAK_2
Praktijk 3	Period 4+5+6	15.0	O_MLPRAK_3
Praktijk onderzoek 1	Period 3, Period 6	3.0	O_MLPROZ_1
Praktijk onderzoek 2	Period 4+5+6	6.0	O_MLPROZ_2

MSc Biology, Research Specialisation Programmes

The prescribed scope of a research specialization is a minimum of 54 EC and includes a research internship (30 EC) and at least three course-based elements from the specialist area (18 EC) and: an extra optional specialization
course (6 EC) or an extension of the internship (6 EC) or the literature study in the field of specialization (9 EC).
When the student chooses one research specialization, the subject of the literature thesis has to lie within the field of specialization (9 EC).
The programme is completed with the compulsory general courses (9 EC), other specialization or optional courses (24 EC) and a second research internship (30 EC).

Programme components:

- Specialisation Brain and Behaviour
- Specialisation Ecology
- MSc Biology, spec. Green Life Sciences

Specialisation Brain and Behaviour

The Master’s graduate with a specialisation in Brain and Behaviour has knowledge, insight and understanding of the multiple facets that play a role in various kinds of behavioural functions and how these are influenced by genes, environmental factors and developmental factors. The Master’s graduate has the ability to conduct scientific research into these processes and can critically assess the results of

neurobehavioral research. He/she possesses knowledge of the significance of brain and behaviour within the context of brain research and some of its clinical implications.
Three specialized courses (18 EC) and a research placement (30) are compulsory, and: an extra optional specialization course (6 EC) or an extension of the
internship (6 EC) or the literature study in the field of specialization (9 EC). The course programme consists of the following components, with the study load for each component given in EC.

Programme components:

- compulsory courses
- choose at least one of these courses

compulsory courses

Courses:

Name	Period	Credits	Code
Internship Brain and Behaviour	Ac. Year (September)	30.0	AM_471151
Methods in Behavioral Neurosciences	Period 1	6.0	AM_470728

choose at least one of these courses

Courses:

Name	Period	Credits	Code
Neuronal Networks in Vivo	Period 2	6.0	AM_1001
System Neurosciences	Period 2	6.0	AM_470712

Specialisation Ecology

The Master's graduate with a specialization in Ecology has a wide-ranging insight into the functioning of and interactions among earth, plants, animals and micro-organisms and approaches these processes from divergent scales ranging from molecular genetic levels to ecosystem scales. The Master's graduate has the ability to conduct scientific research into these processes, to apply these processes to societal problems and to critically assess the results of ecological research.
The Master's graduate in Ecology has specialized in one subject within the field of Ecology. He/she possesses knowledge of current theory and the key research questions in this field and has insight into the scientific and social relevance of this subject area.
Three specialized courses (18 EC) and a research placement (30 EC) are compulsory, and: an extra optional specialization course (6 EC) or an extension of the
internship (6 EC) or the literature study in the field of specialization

(9 EC). The course programme consists of the following components, with the study load for each component given in EC.

Programme components:

- compulsory course
- Compulsory choice of at least 6 EC
- Compulsory choice of at least 6 EC

compulsory course

Courses:

Name	Period	Credits	Code
Experimental Design and Analysis	Period 2	6.0	AM_470505
Internship Ecology	Ac. Year (September)	30.0	AM_471150

Compulsory choice of at least 6 EC

Courses:

Name	Period	Credits	Code
Current Trends in Evolution	Ac. Year (September)	6.0	AMU_0003
Soil-Plant-Animal Interactions		6.0	AM_470507

Compulsory choice of at least 6 EC

Courses:

Name	Period	Credits	Code
Current Trends in Evolution	Ac. Year (September)	6.0	AMU_0003
Ecosystem Services and Scientific Advocacy		6.0	AM_1053
Environmental Genomics and Adaptation	Period 2	6.0	AM_470506
Evolution of Species Interaction		6.0	AMU_0006
Evolutionary Dynamics		6.0	AMU_0007
Masterclasses in Ecology and Evolution	Ac. Year (September)	3.0	AM_1016
Microbial Ecology	Ac. Year (September)	6.0	AMU_0008
Soil-Plant-Animal Interactions		6.0	AM_470507

Spatial Processes in Ecology	Ac. Year (September)	6.0	AMU_0009

MSc Biology, spec. Green Life Sciences

The Master's graduate with a specialization in Green Life Sciences has a broad insight into the molecular mechanisms that govern the growth and development of plants and their defense responses to biotic and abiotic stress. The Master's graduate has specialized in one or two of the key subjects and acquired the ability to conduct and assess scientific research in molecular and developmental processes. He/she has a theoretical background of various aspects of plant biology and current research questions that are being addressed. Moreover, he/she has a good understanding of the applied aspects of plant biology and the possibilities, risks and societal impact of molecular genetic techniques in plant breeding.
Three specialized courses (18 EC) and a research placement (30 EC) are compulsory, and: an extra optional specialization course (6 EC) or an extension of the
internship (6 EC) or the literature study in the field of specialization (9 EC). The course programme consists of the following components, with the study load for each component given in EC.

Programme components:

- Choose three of these courses

Courses:

Name	Period	Credits	Code
Internship Green Life Sciences		30.0	AM_1107

Choose three of these courses

Courses:

Name	Period	Credits	Code
Abiotic Stress		6.0	AM_470628
Biotic Interactions		6.0	AMU_0019
Developmental Biology	Period 2	6.0	AM_470613

compulsory modules

Courses:

Name	Period	Credits	Code
Ethics in Life Sciences	Period 3	3.0	AM_470707

Abiotic Stress

Course code	AM_470628 ()
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	dr. H. Schat
Examinator	dr. H. Schat
Level	600

Course objective
Abiotic stresses represent the most limiting factor for agricultural productivity. This course aims to provide the student with general background knowledge and insight in recent progress on how plants sense abiotic stress and the mechanisms they have acquired to deal with it.

Course content
The course will start with lectures about the specific forms of abiotic stress that plants encounter. These include salinity, drought, heat, cold, and heavy metal stress. Emphasis will be on how plants sense their environment and how perception of external signals is converted into a response at the molecular and physiological levels. Also potential applications for crop improvement will be discussed. Lecture material will be taken from recent reviews and research papers. In the last two weeks, the students will write and present a project proposal on selected subjects

Form of tuition
lectures (12 h), literature study, proposal presentations (8 h)

Type of assessment
written proposal (70%); oral proposal presentation (30%)

Course reading
scientific papers (reviews and primary research papers). Titles will be available 4 weeks before the course start.

Entry requirements
Bachelor Biology, Medical Biology, Biochemistry or equivalent.

Target group
Master students Plant Science and Ecology

Remarks
Please note: this course does not take place in 2010 - 2011; only offered every other year.

Analysis of Governmental Policy

Course code	AM_470571 ()
Period	Period 1
Credits	6.0
Language of tuition	English

Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	M.J. Kishna
Examinator	prof. dr. J.T. de Cock Buning
Teaching staff	prof. dr. J.T. de Cock Buning
Teaching method(s)	Lecture, Study Group, Computer lab
Level	500

Course objective
- To acquire critical knowledge regarding different policy models and theories
- To master the correct use of central concepts in political and policy discourses.
- To further deepen your analytic skills with respect to the critical assessment of a complex societal question or dilemma in the health and life science;
- To learn to integrate science- specific knowledge with the knowledge and skills of other disciplines of the social sciences
- To practice skills in data collection and analysis
- To learn to set up valid lines of argumentation;
- To learn to translate research findings into policy recommendations;
- To get experienced in writing a policy advisory report;
- To improve your communication skills;
- To improve your skills in working effectively in a project team, through team building, team analysis and feedback.

Course content
Governmental policy affects millions of people and is thus object of intensive debate and target of strong societal forces, like political parties, media and interest groups. Being an advisor or policy maker requires a thorough understanding of the dynamics of policy making, as well as from the psychologal side as from the more social structures and their influence on a deliberative democracy.
The course contains several lectures on theoretical concepts and models concerning policy analysis. Furthermore you will be challenged, under supervision, to apply and practice these concepts and models in the project assignment. From the very first day, you will be part of a project team of about ten students. You are confronted with a real policy problem from an external commissioning institution (e. g. a non-governmental organization, a Ministry, an advisory council). Within those 4 weeks you will collect data by literature review and interviews and conduct an interdisciplinary analysis on the basis of which you provide an advice. Specific attention is paid to working in a project team and team building. At the end of the course, you prepare an advisory report. On the last day of the course you present the report to the representative of the external institution who commissioned the project. In that presentation your team will highlight the main results of your analysis and defend the recommendations you propose.

Form of tuition
Analysis of Governmental Policy is a fulltime course of four weeks (6 ECTS). The most recent course schedule is to be found on Blackboard. Tuition methods include lectures, training workshops, and self-study. The different elements have the following study time:
- lectures: 15 hours
- project and self-study: remaining hours (within the project: 18x 1 hour coach meeting)

- examination: 2 hours

Please note that attendance to the project meetings is compulsory. Attendance to the lectures is highly recommended. In our experience, relying on self-study alone is insufficient to pass the exam

Type of assessment
Written exam (25%) and individual evaluation based on personal performance in the project team (50%), and assessment of various group products (report and presentation (25%)). All parts have to be passed successfully.

Course reading
Buse, Mays and Walt: "Making Health Policy" McGrawHill/Open University press. (at least 2nd edition 2012).

Recommended background knowledge
The project integrates the learned lessons from the first compulsory MPA courses: Qualitative & Quantitative Methods.\

Target group
Compulsory course within the Masterprogramme Management, Policy Analysis and entrepreneurship for the health and life sciences (MPA) and the Societal differentiation of Health, Life and Natural Sciences Masters programmes.

Remarks
The case is policy analysis and advice, but the exercised methods and skills are equally applicable to strategic marketing advice or evaluation studies. The teams will be coached by workgroup leaders.

Biotic Interactions

Course code	AMU_0019 ()
Credits	6.0
Faculty	Fac. der Aard- en Levenswetenschappen

Course content
This is an UvA course. For the course description, please visit http://studiegids.uva.nl/

Business Management in Health and Life Sciences

Course code	AM_470584 ()
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	prof. dr. H.J.H.M. Claassen
Examinator	prof. dr. H.J.H.M. Claassen
Teaching staff	prof. dr. H.J.H.M. Claassen
Teaching method(s)	Lecture, Computer lab
Level	500

Course objective
To acquire knowledge and understanding into theory of knowledge valorisation in health and life sciences
To acquire knowledge and insight in how to organise, protect and finance a business in health and life sciences
3To acquire knowledge and understanding into the pharmaceutical industry's business model and business processes
To acquire knowledge and understanding into the challenges that face the pharmaceutical industry
To apply newly acquired knowledge and understanding in writing a business plan
To apply newly acquired knowledge and understanding by solving case examples
To reflect on and critically evaluate the role of the pharmaceutical industry in the healthcare system
To learn to autonomously write a business plan

Course content
As a result of external factors (for example ageing of the population), it is being stated that our healthcare system is under pressure. As a central stakeholder in this healthcare system, the pharmaceutical industry is facing significant challenges the coming years and more than ever, the pharmaceutical industry is challenged to survive. Business Management in the Health and Life Sciences focuses on gaining insight in the pharmaceutical industry, its business model, business processes, challenges, as well as strategies and actions to overcome these challenges.

During the course, prof.dr. Eric Claassen (http://www.falw.vu.nl/en/research/athena-institute/staff/claassen.asp) together with highly experienced guest lecturers from the field will teach theoretical and practical knowledge during lectures and seminars. Tangible subjects that will be discussed during the lectures and seminars include the pharmaceutical industry's business model and business processes, intellectual property, portfolio management, finance, risk capital, grants and subsidies, team building and people management, different legal entities, fiscal and legal aspects when starting a new company, SWOT analysis in the life sciences and clinical trials.

The newly acquired knowledge is tested via an assignment (during which students will write either a personal career business plan or a 'real' business plan) and a written exam, both counting for 50% of the final grade.

Form of tuition
Lectures:35h
Assignment: 4h
Work on assignment (self study): 40h
Self-study: remaining hours

Type of assessment
Written exam: 50%
Personal Business Plan: 50%
Both have to be passed

Course reading
• Osterwalder, A. & Pigneur, Y. (2009). Business model generation. Self-published.
• Kubr, Marchesi & Ilar (McKinsey & company). (1998). Starting up. Achieving success with professional business planning. McKinsey & Company, Inc. The Netherlands, Amstel 344, 1017 AS Amsterdam.

Target group
Optional course for Master students Management, Policy Analysis and Entrepreneurship in Health and Life Sciences (MPA), Societal differentiation of the Health, Life & Natural Sciences.

Remarks
Guest lecturers/organisations:
• Robert Al, TU Eindhoven
• Tamar Weenen, VU university
• Esther Pronker, VU university
• Patrick de Boer & Jochem Bosschenbroek, Ttopstart BV
• Bart van Weezenbeek
• Bart Bergstein, Forbion Capital partners
• Michael Mellink & Majorie Soeter, Odgersberndtson
• Marga Janse, innovatief LerenLeren BV
• NL Octrooicenrtum
• Price Waterhouse Coopers
• AsjesBisseling Belastingadviseurs
• And others to be announced

Clinical development and clinical trials

Course code	AM_470585 ()
Period	Ac. Year (September)
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	prof. dr. H.J.H.M. Claassen
Examinator	prof. dr. H.J.H.M. Claassen
Teaching staff	prof. dr. H.J.H.M. Claassen
Teaching method(s)	Lecture, Computer lab, Study Group
Level	500

Course objective
To acquire knowledge and insight into the role and objectives of drug and clinical development process
To acquire knowledge and insight into the clinical pharmacology in drug development, drug interactions, pharmacodynamic and metabolic interactions
To acquire knowledge and insight into clinical study methodology
To acquire knowledge and skills into the regulatory principles
To acquire knowledge of ICH-GCP and quality
To acquire knowledge and insight into clinical trial coordination
To acquire knowledge and skills into the data management and statistics.
To acquire insight into the ethical aspects
To acquire insight into actual use of clinical trials in R&D strategies

To learn to design a clinical study
To acquire insight into the different epidemiologic study designs
To acquire knowledge and skills into how exposure and disease in a population can be measured and how the relationships between them can be assessed (using SPSS)
To acquire knowledge and skills into interpreting and presenting the results of an epidemiologic study

Course content
The need for rigorous evaluation of components of health care is increasingly recognised worldwide. An important type of evaluation is the clinical trial. The most commonly performed clinical trials evaluate new drugs, medical devices, biologics, or other interventions on patients in strictly scientifically controlled settings, and are required for regulatory authority approval of new therapies. This course aims to provide students with a theoretical and practical understanding of the issues involved in the design, conduct, analysis and interpretation of clinical trials of health interventions. Furthermore classes are provided on which the actual use of clinical trials in day to day R&D strategies within industry and universities is addressed in detail. Classes include: ‘Life Cycle of a Clinical Trial’, ‘Clinical Trial Methodology’, ‘ICH-GCP Principles’, ‘The Ethics Committee’, ‘Safety Considerations in Clinical Trials’, ‘Quality Control & Quality Assurance’, ‘Compliance, Misconduct & Fraud’.
An additional week of basic epidemiology will help you to complement the knowledge obtained so far in the course with an understanding of the principles of other types of study designs (cross-sectional, longitudinal, case-control). Issues concerning exposure and disease measurement and exposure-disease relationships will be discussed in detail, and examples will be provided. Together with your colleagues, you will learn how to apply this knowledge first by hand (during the lectures), then to an epidemiologic database (during the computer-based sessions) and how to interpret the results critically.

Form of tuition
Lectures:25h
(Computer) workgroup: 32h
Preparing the exam: 2h

Type of assessment
Written exam: 100%

Course reading
Will be announced on Blackboard 1 month before the start of the course

Target group
Optional course for Master students Management, Policy Analysis and Entrepreneurship in Health and Life Sciences (MPA), Societal differentiation of the Health, Life & Natural Sciences.

Remarks
Guest lecturers/organisations:
• Eric Klaver
• DOCS
• Others to be announced

Clinical Development and Clinical Trials

Course code	AM_1180 ()
Period	Period 3
Credits	3.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	prof. dr. H.J.H.M. Claassen
Examinator	prof. dr. H.J.H.M. Claassen
Teaching method(s)	Lecture, Study Group
Level	500

Course objective
- to gain knowledge and insight into the function of clinical trials
- to gain knowledge and insight into the design of clinical trials
- to gain knowledge and insight into the conduct of clinical trials, including the applying rules and regulations (including ICH-GCP)
- to gain knowledge and insight into and reflect on the roles, tasks and responsibilities of the stakeholders involved in clinical trials
- to reflect on the role of golden standard in our healthcare system
- to learn where and how to look up rules and regulations.

Course content
In today's healthcare system, clinical trials have gained the status of golden standard to test the safety and efficacy of newly developed drugs. For new drugs to enter the market, clinical trials must be passed and as a consequence, clinical trial outcomes have major effects on our healthcare system. While our healthcare system currently is under pressure to remain affordable and available to all, at the same time, clinical trial regulations are increasingly tightened and the prominence of clinical trials in our healthcare system is being criticized. For that matter, it is of great importance to learn about and reflect on the role of clinical trials in today's healthcare system.

The Clinical Development & Clinical Trials course will elaborate on the function, design and conduct of clinical trials, as well as the relevant stakeholders involved. The course consists of a theoretical part and an important practical part (e.g. gaining knowledge on clinical trial regulations). Classes include for example: 'Life Cycle of a Clinical Trial', 'Clinical Trial Methodology', 'ICH-GCP Principles', 'The Ethics Committee', 'Safety Considerations in Clinical Trials', 'Quality Control & Quality Assurance', 'Compliance, Misconduct & Fraud'.

The gained knowledge and skills will be evaluated by means of a written exam at the end of the course.

Form of tuition
Lectures: 35 h.
Self study: remaining hours

Type of assessment
Written exam: 100%.

Course reading
Will be announced on Blackboard 1 month before the start of the course.

Target group

Optional course for Master students Management, Policy Analysis and Entrepreneurship in Health and Life Sciences (MPA), Societal differentiation of the Health, Life & Natural Sciences.

Remarks
Guest lecturers/organisations:
• Eric Klaver
• DOCS
• Others to be announced.

Communication, Organization and Management

Course code	AM_470572 ()
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	M.J. Kishna
Examinator	M.J. Kishna
Teaching staff	dr. H. Wels, prof. dr. F. Scheele, dr. M.B.M. Zweekhorst
Teaching method(s)	Lecture, Study Group
Level	500

Course objective
To get acquainted with theories on organisational behaviour
To obtain a deeper understanding of communication from the perspective of sharing and influencing results
To acquire knowledge on organisational structures and designs
To get acquainted with important theories on organisational transitions and change management
To acquire insight into different management practices in the health and life sciences sector
To gain insight in leadership and interpersonal behaviour
To obtain insight in methods for motivation and conflict management
To improve communication skills
To practise analytical and advisory skills

Course content
Organisations in the health and life science sector are changing fast, a phenomenon driven by newly emerging technologies and increasing societal complexity. A growing number of students with a beta degree will hold professional and managerial functions in these organisations. During this course students will learn how to be effective performers within these environments, both individually and in teams. This requires an understanding of the macro aspects of organisational behaviour, including designing organisations, managerial skills and ways of strategic thinking. Several speakers conduct lecturers on aspects as motivation, managing interpersonal behaviour, leadership, communication and developing and changing organisations. The speakers explain theories from literature and relate them to their practical experiences. In addition, the students interview managers in health organisations and analyse these interviews using the newly acquired theoretical concepts. Also, practical cases of health care companies will be analysed and discussed, resulting in advisory reports for management. With the other students you discuss your experiences and a coach helps you relate the

experiences to theory.

Form of tuition
Lectures: approximately 22 hours
Response lectures: 4 hours
Training workshops 12 hours
Self-study and writing project assignment: remaining hours.

Type of assessment
Written exam (60%;) and assessment of the interviews, case study analysis, and reports (40%). Grades of both parts must at least be 6 or higher.

Course reading
To be announced on Blackboard

Target group
Compulsory course within the Master programme Management, Policy Analysis and Entrepreneurship for the Health and Life Sciences (MPA) and the Societal differentiation of Health, Life and Natural Sciences Masters programmes

Remarks
Attendance to training, workshops, interviews and discussions is indispensable

Current Trends in Evolution

Course code	AMU_0003 ()
Period	Ac. Year (September)
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen

Course content
http://studiegids.uva.nl/xmlpages/page/2015-2016/zoek-vak/vak/74140

Registration procedure
This course is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-science@uva.nl, +31 (0)20 525 7100.
Enrolment via https://m.sis.uva.nl/vakaanmelden is required.

Developmental Biology

Course code	AM_470613 ()
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Examinator	prof. dr. R.E. Koes
Teaching staff	dr. R.F.G. Toonen, prof. dr. R.E. Koes
Teaching method(s)	Lecture, Seminar, Study Group

Level	600

Course objective
The development of a single cell, the fertilized egg cell, into a complex organism with all its tissue and organs in the right place is one of the most intriguing phenomena in biology. Whereas disciplines like molecular and cell biology aim to unravel the molecular mechanisms of a single cell, developmental biology aims to understand how such mechanisms make cells work together in a coherent way to form an entire organism. The overall aim of this course is to provide insight into these molecular mechanisms, such as the regulation of the expression of master genes and cell-to-cell signaling pathways underlying plant and animal development.

Final attainment levels:
- the student has a basic understanding of morphological events that take place during embryogenesis in animals
- the student can describe and distinguish key-concepts in development, such as (i) pattern formation (ii) determination of cell fate, (ii) differentiation and link that to general phenomena known in molecular biology, such as gene regulation, epigenetic phenomena, cell-signalling etc.
- The student can describe the (dis)similarities in the development of animals as different as fruitflies and vertebrates, in terms of morphological events and underlying molecular mechanisms.
- The student can explain the paradox that development of organisms with very different morphologies is governed by deeply conserved genes, and understands the molecular evidence for the current ideas.
- The student acquires experience in the critical analysis and discussion of experimental data as presented in research papers and the presentation of such data for a large(r) audience.

Course content
The first two weeks will be shared with the MSc course Developmental Neurobiology of the Vertebrate Brain. The first week consists of lectures on general developmental biology. For the second week one of two
paths can be chosen: (1) Development of the brain or (2) Plant development. The first part of the course finishes with a written "mid term exam"
In the third and the fourth week the focus shift to specific "hot topics" and research. Three or four masterclasses will be given by invited speakers/researchers that will give an overview of their own research field and discuss their (recent) experimental results. Furthermore, students (couples) will choose 2-3 recent research papers on a hot topic of their interest that they will study in depth to prepare for a small masterclass at the end of week 4 in which they outline the current status of the chosen subject, and present (and critically evaluate) the latest experimental data. Students can freely choose papers on plant or animal development. This ensures that everyone can follow his/her own preference for animal or plant biology and that, in the end, everyone gets a broad view on what is is currently going on in (plant or animal) developmental biology.

Specific issues that we will address in the first two weeks are:
- General key-concepts in development, such as pattern formation, segmentation, determination of cell fate, with emphasis on the experimental evidence on which our current knowledge is based

- Research strategies that are widely used in developmental biology.
- Molecular mechanisms that govern the development of embryos in insects (Drosophila) and vertebrates
- Elementary aspects of stem cell biology and "reprogramming" of differentiated cells into stems cells
- Evolutionary aspects: how can it be that deeply conserved genes govern the development of organisms with entirely different bodyplans, like fruitflies and vertebrates, or weed plants and trees.
- Late events in embryogenesis, the formation of organs (organogenesis). This will be entirely focused on development of the brain (for students taking the path Brain development)
- Early (embryogenesis) and late events (development of flowers and leaves) in the development of plants. What are similarities and differences with the development of animals?

In the last two weeks we will focus in depth on research concerning particular "topics that are currently "hot" in developmental biology. Subjects that will be covered by invited speakers are:
- Development and functioning of stem cells and stem cell niches in the intestine.
- Role of Hox genes in the segmentation and later development of vertebrates
- Molecular mechanisms that govern pattern formation in plants
Subjects that wiil be covered in the masterclasses given by student depends on the choices that are made during the course and are, therefore, not entirely predictable beforehand. Some of the subjects that will almost certainly be covered are:
- Reprogramming of differentiated cells into stems cells and dangers/possibilities for use of such cells in therapy
- Intercellular movement of proteins like transcription factors, which were hitherto always believed to act only in the cells where they are synthesized

Form of tuition
Lectures and masterclasses (~ 58 hrs).
Self study (~ 55 hrs)

Type of assessment
Written exam (50%)
Oral presentations and (written) abstract (40%)
Active participation to discussions during masterclasses (10%)

Course reading
There is no specific handbook. You might find it useful to consult, on occasion, a handbook (any) to refresh your memory on some basic cellular processes, like gene regulation, signaling and so on, if that is necessary.
Handouts, incl. PowerPoint files of lectures, pdf files of relevant review and research papers will be provided via the Blackboard site.

Entry requirements
Basic knowledge (level 1/2) of molecular biology in particular mechanisms underlying regulation of gene expression, cell-signalling.
General affection for molecular biology is recommended

Target group
Master students: Biomolecular Sciences, Biology, Biomedical Sciences

Didactiek 1

Course code	O_MLDIDAC_1 ()
Period	Period 1, Period 4
Credits	6.0
Language of tuition	Dutch
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	C.L. Geraedts
Examinator	dr. A. Handelzalts
Teaching staff	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, ir. E.J.F. Scheringa, drs. W.S. Hoekstra, drs. C.D.P. van Oeveren, drs. S. Donszelmann, drs. B. Klein, drs. W. Jongejan, drs. L.J. van Well-van Grootheest, dr. H.B. Westbroek, C.L. Geraedts, drs. A. Krijgsman, dr. A.A. Kaal, dr. A. Handelzalts, drs. K.L. Schaap, W. Maas, F.L. de Vries MSc, drs. H. Stouthart, drs. I. Pauw
Teaching method(s)	Lecture, Study Group
Level	400

Didactiek 2

Course code	O_MLDIDAC_2 ()
Period	Period 2+3, Period 5+6
Credits	6.0
Language of tuition	Dutch
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	drs. B. Klein
Examinator	dr. A. Handelzalts
Teaching staff	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, ir. E.J.F. Scheringa, drs. W.S. Hoekstra, drs. C.D.P. van Oeveren, drs. S. Donszelmann, drs. B. Klein, drs. W. Jongejan, drs. L.J. van Well-van Grootheest, dr. H.B. Westbroek, C.L. Geraedts, drs. A. Krijgsman, dr. A.A. Kaal, dr. A. Handelzalts, drs. K.L. Schaap, W. Maas, F.L. de Vries MSc, drs. H. Stouthart, drs. I. Pauw
Teaching method(s)	Study Group, Lecture
Level	400

Didactiek 3

Course code	O_MLDIDAC_3 ()
Period	Period 4+5+6
Credits	9.0
Language of tuition	Dutch
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	drs. K.L. Schaap
Examinator	drs. K.L. Schaap

Teaching staff	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, ir. E.J.F. Scheringa, drs. W.S. Hoekstra, drs. C.D.P. van Oeveren, drs. S. Donszelmann, drs. B. Klein, drs. W. Jongejan, drs. L.J. van Well-van Grootheest, dr. H.B. Westbroek, C.L. Geraedts, drs. A. Krijgsman, dr. A.A. Kaal, dr. A. Handelzalts, drs. K.L. Schaap, W. Maas, F.L. de Vries MSc, drs. H. Stouthart, drs. I. Pauw
Teaching method(s)	Lecture, Study Group
Level	400

Disability and Development

Course code	AM_470588 ()
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	dr. R.M.H. Peters
Examinator	dr. R.M.H. Peters
Teaching method(s)	Lecture, Study Group
Level	500

Course objective
• To develop an understanding of disability and the issues faced by people with disabilities
• To develop knowledge and skills for disability research, policy development and management related to disability, rehabilitation and development
• To acquire insight into the epidemiology of disability, with separate attention for important determinants like gender, poverty and HIV/AIDS
• To learn how to use relevant models of disability and the conceptual framework of the International Classification of Functioning, Disability and Health (ICF)
• To understand the importance of human rights in relation to disability and to learn to use the UN Convention for the Rights of Persons with Disabilities for advocacy and other rights-based interventions
• To acquire skills and knowledge in measurement and research methods relevant to disability
• To understand the importance of inter-sectoral collaboration
• To gain insight in participatory approaches

Course content
The Disability and Development (D&D) course focuses on a broad range of issues related to disability and rehabilitation in the context of development. This means that the focus is on people with disabilities in low and middle-income countries. Disability affects an estimated 1 billion people worldwide, the majority of whom live in low and middle-income countries. The large majority are poor and have no access to rehabilitation services; neither are facilities in place to allow them to be included in the mainstream of society.

To date, very few services and programmes are available to address these needs. The realisation that the Millennium Development Goals cannot be met without addressing the needs of people with disability has brought a new impetus to the field of disability and development. Another major recent development was the adoption of the UN Convention on the Rights of Persons with Disabilities in December 2006. It is expected that there will be a substantial increase in demand for training of a large variety of professionals (e.g. researchers, managers, architects, lawyers, health professionals) with formal training and qualifications in the field of disability-inclusive development.

This rapidly increasing interest in disability, as a development and human rights issue, means that this emerging field of study will rapidly gain in importance and should become part of any serious higher education programme in social and development studies and in international public health. The course will cover essential knowledge and skills in this subject.

The 4-week course programme will include the following subjects:
• Disability models and stereotypes,
• Frequencies and distribution of disability,
• Experience of having a disability,
• ICF conceptual framework,
• Disability rights, including the UN Convention on the Rights of Persons with Disabilities,
• Culture and disability,
• Determinants of disability, including stigma and discrimination, poverty, gender and HIV/AIDS,
• Disability-relevant research methods, including examples of disability research
• An introduction to community-based rehabilitation and disability inclusive development.

Form of tuition
Problem-based learning supported by lectures and an article writing assignment.

• Lectures: 36 hours
• Tutorial groups: 18 hours
• Other events: 12 hours
• Self-study: remaining hours

Type of assessment
Participation in tutorial groups: 10%
Take-home examination, submitted electronically: 60%
Scientific article/essay: 30%

For all parts a pass grade (> 5.5) needs to be obtained in order to receive a final mark.

Course reading
See e-reader

Entry requirements
Bachelor-level education; any subject

Target group

The Disability & Development module is an optional course for Master students Management, Policy Analysis and Entrepreneurship in Health and Life Sciences (MPA), International Public Health and Biomedical Sciences; external students from low and middle-income countries are strongly encouraged to apply. We encourage the participation of students with disabilities, especially from low and middle-income countries.

Remarks
For more information contact Ruth Peters (r.m.h.peters@vu.nl)

Ecosystem Services and Scientific Advocacy

Course code	AM_1053 ()
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	prof. dr. J.A. Harvey
Examinator	prof. dr. J.A. Harvey
Teaching method(s)	Lecture

Course objective
1. To stimulate the students in developing critical ways to evaluate and interpret scientific information, and particularly information on issues related to society, ecosystem services and the environment.
2. To teach students to filter through a large body of information that broaches both science and society.

The final attainment levels of this course include that students
1. understand the natural (ecological) economy and the many ways in which it sustains the material (human) economy through the provisioning of conditions and processes that underpin civilization.
2. have the ability to evaluate the ways in which humans impact nature and how this is intimately linked with population and consumption patterns that differ between nation states.
3. know how to determine how sustainable (or not) different nations of the world are.
4. have the skills to critically evaluate the efficacy of information presented by various sources (the media, internet etc.) on scientific and environmental processes and problems.
5. can assess the role of scientists in studying and disseminating the results of their research to society, and whether their views should cross the threshold into the policy arena.

Course content
Four main topics with varying overlap and several themes.

1. Ecosystem services (ES) from an economic perspective; initial discussion of important ecosystem services (focusing on provisioning and supporting e.g. fisheries, crops, nutrient cycling, soil fertility, pest control etc. Five to six lectures envisaged by J. Harvey and several guest speakers. Assignment for students: provide an example of an ES that has been valuated (quantifiably) by economists. Try and find one that falls in to the category of ‘supporting’ because these are the most problematic in terms of valuation and prepare a short presentation. Following this, discussion groups are assembled to debate and argue over the over- or under-valuation of the services studied. Votes are taken

amongst the student body before and after the debate to see whose arguments are most convincing.

2. Indices measuring human impact on the biosphere and on important ES. Focuses on ecological footprint analyses (EFA) and how they relate to nation states and the biosphere as a whole. Five to six lectures envisaged by J. Harvey and several guest speakers. Assignment: select a country and evaluate/calculate its ecological footprint in an essay. Is the country sustainable? How much must it reduce its footprint to achieve sustainability?

3.Critical evaluation of information on ecology and environmental issues. How accurate is the media in covering issues such as climate change and biodiversity loss? What other sources of information compete for public attention? How accurate are blogs and web sites on the internet? Are there hidden (or not-so-hidden) agendas that are at work? How does one deal with the huge amount of information at our disposal? Five to six lectures envisaged by J. Harvey and several guest speakers. Assignment: presentation of an analysis of a newspaper or internet article on a recent environmental issue. Evaluate its accuracy of information and possible alternate agenda.

4. The role of scientists: how far should we step outside of the university and research labs in disseminating information? The costs (professional risks) and benefits (pro-active) of becoming involved in societal debates. Lectures by prominent scientists. Assignment: write a critical review or evaluation of an important environmental issue, and design a plan for accurately conveying information on the subject to the public through the media or internet.

Form of tuition
Lectures and Workshops

Type of assessment
Based on essays (50%) and presentations and contributions to workshops (50%)

Course reading
Selected papers

Entry requirements
BSc in Biology, Earth and Economy, Future Planet Studies or Bèta-gamma with a minor in environmental science or ecology. Students with other previous education should contact the course coordinator.

Target group
MSc students with a focus on ecological economics. The maximum number of participants is 50. Priority is granted to students in the MSc Ecology and Evolution programme of the VU and UvA.

Educational and Pedagogical Studies I

Course code	O_MLADEPI ()
Period	Period 1+2
Credits	6.0
Language of tuition	Dutch
Faculty	Fac. der Gedrags- en Bewegingswetensch.

Coordinator	dr. A. Handelzalts
Examinator	dr. A. Handelzalts
Teaching staff	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, drs. W.S. Hoekstra, drs. C.D.P. van Oeveren, drs. S. Donszelmann, drs. B. Klein, drs. W. Jongejan, dr. H.B. Westbroek, C.L. Geraedts, drs. A. Krijgsman, dr. A.A. Kaal, drs. K.L. Schaap, W. Maas, F.L. de Vries MSc, drs. H. Stouthart, drs. I. Pauw
Teaching method(s)	Lecture
Level	500

Educational and Pedagogical Studies II

Course code	O_MLADEPII ()
Period	Period 1+2
Credits	3.0
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. A. Handelzalts
Examinator	dr. A. Handelzalts
Teaching staff	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, drs. W.S. Hoekstra, drs. C.D.P. van Oeveren, drs. S. Donszelmann, drs. B. Klein, dr. T. Bosma, dr. H.B. Westbroek, C.L. Geraedts, drs. A. Krijgsman, dr. A.A. Kaal, drs. K.L. Schaap, W. Maas, F.L. de Vries MSc, drs. H. Stouthart, drs. I. Pauw
Teaching method(s)	Lecture, Seminar
Level	500

Entrepreneurship in Health and Life Sc.

Course code	AM_470575 ()
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	prof. dr. E. Masurel
Examinator	prof. dr. E. Masurel
Teaching staff	prof. dr. E. Masurel
Teaching method(s)	Lecture, Study Group
Level	500

Course objective
Students obtain knowledge about and insight in the relevance of entrepreneurship and innovation for their own discipline. Students learn about the processes which are involved in the recognition and exploitation of opportunities, about creating economic and social value and about the nature and role of networks. In addition students gain knowledge of different entrepreneurial processes and the importance of valorisation of (bio)medical findings and business ideas for a

knowledge-based economy.
Learning objectives

- Become familiar with an innovation outlook on entrepreneurship.
- Become aware that value-adding opportunities not only contain financial aspects but also social and ecological aspects (sustainable entrepreneurship).
- Gain the ability to write a feasibility plan on how to bring an innovation to the market.
- Obtain knowledge about and insight in the relevance of entrepreneurship and innovation for science disciplines.
- Learn about the processes which are involved in the recognition and exploitation of opportunities, about creating economic and social value and about the nature and role of networks.
- Gain knowledge of different entrepreneurial processes and the importance of valorisation of (bio)medical findings and business ideas for a knowledge-based economy.

Course content
This course consists of two tracks: a theoretical track and a practical track. These two tracks run simultaneously. In the first track you learn about entrepreneurship. Answers are found on questions such as: What is entrepreneurship? What defines an entrepreneur? What are entrepreneurial opportunities? What is the role of innovation in entrepreneurship? What is corporate social responsibility (CSR)? How can we judge the feasibility of entrepreneurial ambitions? Simultaneously you work on an assignment (second track). In the first week of this course you search for an innovation in your own discipline (product, service, process etc). Your choice must be approved by the lecturers. The first part of the assignment consists of a description of the innovation which you have chosen. Subsequently, you make a SWOT-analysis and a network analysis of the innovation. Also a paragraph on CSR aspect should be added. The final part of the assignment is your own feasibility study: how would you valorize the innovation to the market?

Form of tuition
Lectures, personal meetings. Each week scientific lectures are given (on entrepreneurship, SWOT-analysis, innovation, CSR etc). These lectures are both the basis for the exam and for the assignment. Each week the student has a short meeting with his / her supervisor, in order to discuss the progress of his/her assignment.

Schedule and study time
The total study time is 160 hours.
Tuition methods include lectures, consultancies and self-study.
The different elements have the following study time:
- lectures 18 hours
- consultancies 8 hours
- writing feasibility plan 65 hours
- examination 4 hours
- self study remaining hours

Type of assessment
You conduct a written exam and an assignment. Both the exam and the assignment determine 50% of the grade. The exam and the assignment must be of sufficient quality.

Course reading

To be announced on Blackboard

Target group
Optional course for Master students Management, Policy Analysis and Entrepreneurship in Health and Life sciences (MPA), M-differentiation of the Health, Life & Natural Sciences, Biology, Biomedical Sciences.

Remarks
Attendance is compulsory. Prior knowledge: Business Management in Health and Life sciences.

Environmental Genomics and Adaptation

Course code	AM_470506 ()
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	dr. ir. T.F.M. Roelofs
Examinator	dr. ir. T.F.M. Roelofs
Teaching staff	dr. ir. T.F.M. Roelofs
Teaching method(s)	Lecture, Computer lab, Practical, Study Group, Seminar
Level	500

Course objective
Students will be able to:
1 Describe different molecular genetic techniques to study gene expression and genomic variation in response to environmental stimuli.
2 Explain how to use these techniques in ecological and physiological research.
3 Analyze experimental data generated by genomics research and knowing the possibilities for follow-up research
4 Find and analyze genomic data in databases on internet.
5 Describe the functional significance of genomic variation for organisms and populations in natural environments.
6 Characterize the evolutionary consequences of such variation for species abundance, community diversity, and the evolution of speciation

Course content
Researchers in ecology and physiology are making extensive use of molecular techniques. Environmental genomics can be applied to advance our
understanding of the way organisms functionally respond to changes within their local environment. Such responses may have consequences for species
abundance, community diversity, and the evolution of speciation. In this course we will focus on:
Regulation of gene expression. Which genes are turned on in response to environmental challenge, and what do they do?
Differences in the molecular basis of fitness among individuals.
Is there intraspecific variation in gene expression in response to environmental change, and is this variation adaptive?
Furthermore, we will assess evolutionary consequences of genomic variation. What are the
ecosystem-, community-, and population-level consequences of the

molecular transformations in the genome? Does gene family expansion and contraction drive speciation, or does the emergence of new gene bodies and protein domains add to speciation?
We will follow topics covered by chapters in the book `An Introduction to Ecological Genomics' and include molecular adaptation to drought, genetic marker development and analytical methods, evolution of metal tolerance, speciation genetics.
Practical training include a Gene expression experiment, designed and executed by the students. Also, a computer exercise on transcriptomics (microarray data) will be performed. These data are extracted from peer-reviewed scientific papers. Finally, a journal club will be organized, in which students present a scientific paper on an Ecological Genomics topic.
The field of ecological genomics moves extermely quickly. Consequently, topics addressed in the accompanying book will be out of date to some extent. In order to address up-to-date and stat-of-art knowledge on ecological genomics topics, specialists in this field will be invited to give guest lectures.

Form of tuition
Lectures & Guest Lectures
Seminar (journal club) discussing recent literature on Environmental genomics. Presentation of a scientific paper during this seminar.
Written report summarizing the content of the presented scientific paper.
Practical training regarding gene expression analysis using Q-PCR technology.
Written report of Practical: Introduction, Material & Methods, Results and Discussion.
Computer exercise on transcriptomic data retrieved from public databases. The Limma package in R will be used predominantly. TIGR Mev software will be applied to visualize data output.
Self study

Type of assessment
Pres: Assessment of oral presentation of a research paper by a panel consisting of course coordinator, junior lecturer and Post-doc. Standardized forms will be used to retrieve scores for different aspects of the presentation.
Verslag: Assessment of written reports on QPCR practical and scientific paper
Mean grade of presentation and written reports will make up 30% of the final grade; presentation can be compensated with written report and visa versa.
Tentamen: Written exam consisting of open questions will make up 70% of final grade. A score of at least 5.5 for the written exam is required to pass this course.

Course reading
N. M. van Straalen and D. Roelofs 2011. An Introduction to Ecological Genomics, 2nd edition. Oxford University Press.

Entry requirements
BSc level course on molecular biology, such as BSc course on Evolutionary Genetics (AB_1022) or Developmental Biology (AM_470613)

Target group
MSc students Biology and Ecology from VU and UvA

Registration procedure
Standard via VUnet

Epidemiology

Course code	AM_1179 ()
Period	Period 3
Credits	3.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	dr. R.M.H. Peters
Examinator	dr. R.M.H. Peters
Teaching method(s)	Lecture, Study Group, Computer lab
Level	500

Course objective
• To gain an understanding of the principles of different study designs
• To gain an understanding of issues concerning measures of disease and association
• To gain an understanding of principles of bias and confounding
• To gain an understanding of the principles of screening and critically appraise its use in public health
• To learn how to calculate and interpret sensitivity, specificity, positive and negative predictive values
• To acquire skills to perform statistical analyses using a database (during the computer-based sessions) and interpret, describe and present the results critically

Course content
This two week course will help you to obtain an understanding of the principles of study designs (cross-sectional, longitudinal, case-control, clinical trails). Issues concerning exposure and disease measurement and exposure-disease relationships will be discussed in detail, and examples will be provided. Together with your colleagues, you will learn how to apply this knowledge first by hand (during the lectures), then to an epidemiologic database (during the computer-based sessions) and how to interpret the results critically.

Form of tuition
• Lectures (12 hours)
• Work groups (12 hours)
• Computer practicum (12 hours)
• Self-study (remaining time)

Type of assessment
• Exam
• Assignment
Both elements need to be passed.

Course reading
To be announced

Target group

Students without a background in epidemiology

Registration procedure
n/a

Remarks
Maximum 25 students

For more information contact Ruth Peters (r.m.h.peters@vu.nl)

Ethics in Life Sciences

Course code	AM_470707 ()
Period	Period 3
Credits	3.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	prof. dr. J.T. de Cock Buning
Examinator	prof. dr. J.T. de Cock Buning
Teaching staff	prof. dr. J.T. de Cock Buning, dr. J.F.H. Kupper
Teaching method(s)	Lecture, Study Group
Level	400

Course objective
To provide a toolbox of ethical instruments to analyze properly moral problems related (to one's own) research in the life sciences
• To acquire conceptual knowledge of the central concepts in applied philosophy and professional ethics
• To challenge an ethical reflection on one owns life science specialization and to open it for an impartial and constructive discussion
• To exercise a team based project to enter prepare and execute a moral dialogue
• To acquire the necessary skills to handle ethical issues in an accountable manner, as a professional academic beyond one's own inclinations and prejudgments

Course content
Researchers in life sciences generate the knowledge that builds the future of our society. Therefore, professional academics should be accountable for their decisions, experimental designs and presentation of results. In this short course, the principles of justification will be illustrated with cases of technology ethics and medical ethics. The way an ethical review committee on animal research works, is simulated by a role play exercise on an actual research protocol. Finally, as a small group training project, an ethical dialogue is prepared and executed together with another team.

Form of tuition
Ethics in the Life Sciences is a fulltime course of four weeks (3 ECTS). The total study time is 80 hours.
The different elements have the following study time:
• Lectures: 13 hours
• Work groups: 17 hours
• Group assignment: 24 hours

• Exam: 2 hour
• Presentation : 4 hours
• Self working (reading in the first week): 20 hours
Please note that attendance to the work group meetings is compulsory. Attendance to the lectures is highly recommended. In our experience, relying on self-study alone is insufficient to apply the theory of the lectures in the assignments of the workgroups, and to pass the exam.

Type of assessment
• Degree of intellectual participation in the workgroups (10%)
• exam (50%) has to be passed
• written and verbal execution of the ethical dialogue (40%)

Course reading
Available on Blackboard

Entry requirements
Bsc Biology, Biomedical Sciences, Psychology with profile Biological Psychology or Neuropsychology

Target group
Compulsory course in all FALW Master programmes, except Health Sciences and Neuro Sciences

Remarks
Lectures in English, part of the workgroups are in Dutch. All presentations and plenary discussions in English.
In order to maximize the experience of differences in values and preferences, and this increase meaningful ethical inquiry we will place you randomly in the workgroups. Placement will be communicated after the introduction lecture.

Evolution of Species Interaction

Course code	AMU_0006 ()
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	dr. ir. T.F.M. Roelofs
Examinator	dr. ir. T.F.M. Roelofs

Course content
This is an UvA course. For the course description, please visit http://studiegids.uva.nl/

Evolutionary Dynamics

Course code	AMU_0007 ()
Credits	6.0
Faculty	Fac. der Aard- en Levenswetenschappen

Course content
This is an UvA course. For the course description, please visit http://studiegids.uva.nl/

Experimental Design and Analysis

Course code	AM_470505 ()
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	dr. J.T. Weedon
Examinator	dr. J.T. Weedon
Teaching staff	dr. G.J.J. Driessen, dr. P.H. Vos, J. Duivenvoorden, dr. J.T. Weedon
Teaching method(s)	Lecture, Computer lab
Level	500

Course objective
The final attainment levels of this course, include that students:
- Are acquainted with possible experimental designs and can select the most suitable design depending on experimental objective and hypothesis
- Are acquainted with possible statistical analyses, understand the theory and the assumptions underlying the various analyses and can test the underlying assumptions
- Can select the most suitable statistical analysis depending on the design chosen and the statistical assumptions
- Can interpret the chain of hypotheses, design and analysis to validate hypotheses on-field-conditions and model behaviour

Course content
A proper experimental design combined to a suitable statistical analysis is essential to -biological- science, even though it is considered by many as a necessary evil. In this course, the whole chain of hypothesis and design to analysis and interpretation is covered to allow students to apply a range of statistical techniques independently. The application
and implementation of the techniques (in R) is the basis. Possible experimental designs are discussed in relation to specific biological questions and hypotheses. The application of statistical analysis is treated in relation to these designs. Theory and especially the assumptions underlying the test are treated to the extent that this information is necessary to apply the tests properly. Both -combinations of- regression and analysis of variance techniques and multivariate analysis techniques like unconstrained and constrained ordination and meta
analysis are dealt with. Other biological questions like classification issues, working with large datasets, data reduction and multiple response variables are discussed.

Form of tuition
As application is central to this course, case studies, assignments and working with real biological data is the core of this course. Starting of with the research question, hypothesis and the lab/field/model situation a proper design and statistical analysis will be discussed. A specific case study, explained by the researcher who performed that particular research, is used to illustrate this chain of arguments. Theory, assumptions and tests are all treated in the context of these

case studies and are coupled directly to the case study and subsequent assignments. The course is finalised with an extensive case study, to which the theory is applied. This set-up translates into 30 contact hours for lectures, 4 contact hours for a practical on the first assignment and 20 contact hours for feedback on the assignments .

Type of assessment
Report on the final case study (100%)

Course reading
Quinn, G.P. and M.J. Keough (2002), Experimental design and data analysis for biologists Cambridge University Press

Dalgaard, P. (2008) Introductory Statistics with R

Logan, M. (2010) Biostatistical Design and Analysis Using R: A Practical Guide. Wiley

Borcard, D., F. Gillet and P. Legendre (2011) Numerical ecology in R. Springer

Bolker, B.M., M.E. Brooks, C.J. Clark, S.W. Geange, J.R. Poulsen, M.H.H. Stevens and J.S. White (2009). Generalized linear mixed models: a practical guide for ecology and evolution. Trends Ecol. Evol. 24: 127-135

Gurevitch, J. and L.V. Hedges (1999) Statistical issues in ecological meta-analyses. Ecology 80: 1142-1149

This literature is complimented by a syllabus, explanations on assignments, answers to the assignments, lecture handouts, background information, background notes on Blackboard.

Entry requirements
Methodology and statistics 1 and 2 or equivalent statistics courses. This implies that we require students to understand the interpretation of P-values, type I and type II errors and statistical hypotheses testing in general. In addition, students are required to have understanding on t-tests (paired and unpaired), linear regression and one-way ANOVAs.

Target group
The course is compulsory for MSc Ecology students at the VU doing the Ecology and Evolution or the Environmental Chemistry and Toxicology specialization and for UvA students doing the Ecology and Evolution specialization of the master Biological Science. The course is also open for master students in Biology, Ecology or Earth Sciences and PhD students at the VU and UvA universities with a deficiency in experimental design and statistics.

Remarks
The course is organized by the Department of Ecolgical Science at the VU and the Institute for Biodiversity and Ecosystem Dynamics of the UvA. All contact hours are at VU University.

Lecturers:
dr. J.T. Weedon,
dr. J. Duivenvoorden,

dr. M. Egas

Health, Globalisation and Human Rights

Course code	AM_470818 ()
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	A. van Luijn MSc
Examinator	dr. C.W.M. Dedding
Teaching staff	prof. dr. P. Heutink
Teaching method(s)	Lecture, Study Group
Level	500

Course objective
The student;

- Is able to describe, understand and apply human rights concepts in a global context
- Develops a deeper understanding and A critical attitude towards scientific literature in the field of health, globalization and human rights in order to formulate soundly argued positions
- Is able to create his/her own vision with regard to the socio-cultural dimensions of human rights values in relation to public health
- Is able to apply methods of human rights assessment in relation to innovations in health care
- Demonstrates the ability to write and present according to academic standards

Course content
This course focuses on the human rights issues that are raised around the globe in connection with public health concerns. The course introduces the students to the effects of globalization on health issues, to the relevant UN human rights instruments on health and to the mechanisms to promote and protect these rights. Attention is given to a wide range of human rights topics in which health and well being play a crucial role. Examples are situations of armed conflict, reproductive rights, migration and refugee issues and childrens rights. Within the context of current globalisation processes the importance of local cultural insights into the human rights & public health interaction will be discussed. During the course students will prepare and participate in a simulation on a human rights assessment of innovations in health technology and discuss relevant scientific literature in study groups. In the exam students will show their creative problem-solving skills applying them to human rights dilemmas in public health.

Form of tuition
Contact hours

Lectures: 33 hours
Work groups: 12 hours
Group project, simulation and exam: 11 hours

Self study and preparing: remaining hours

Type of assessment
Group project (10%), Simulation (20%), exam (70%). All parts need to be passed (6.0)

Course reading
To be announced at the start of the first work group/lecture

Target group
Optional course for students in all differentiations of the Masters Health Sciences, Biomedical Sciences and Management, Policy Analysis and Entrepreneurship in Health and Life Sciences.

Remarks
(Guest) Lectures and guest organisations (under reservation):
Cees Hamelink
Christine Dedding (Children and rights)
Fiona Budge (Culture and Health)
Bert Keizer (Elderly Rights)
Els Mons (Rights and disabled persons)
Women on Waves
Doctors without Borders
And more to be announced.

For more information contact Wanda Konijn (w.s.konijn@vu.nl) or Anna van Luijn (a.van.luijn@vu.nl)

Internship Brain and Behaviour

Course code	AM_471151 ()
Period	Ac. Year (September)
Credits	30.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	dr. R.J. van Belle-van den Berg
Examinator	dr. R.J. van Belle-van den Berg
Level	600

Course objective
The internship is a compulsory part of the Master's programme and involves many different aspects, such as theoretical preparation, practical execution, literature survey, report writing, oral presentation, and participation in the scientific activities of a research department.

The internship should be related to Brain and Behaviour.

At the end of the internship a scientific report of the work has to be written as well as an oral presentation given.

For more (detailed) information, please see the placement manual on Blackboard (ALW_BMW_9999_01: Master Programmes Biomedical Sciences and Biology)

Course content
The internship is a compulsory part of the Masters' programme in Biology.
The internship has to be preceded by a research proposal. During the internship, you collect your data and you do the final analysis. Finally you present your findings both orally and in a report.

Internships can be done at various locations, but should be part of an academical or research institute. Projects at academical or research institutes outside the Netherlands are also accepted, provided they are of sufficient academic quality and adequate on-site supervision is guaranteed. In all cases: take care that you will be working on research related to your specialization and that you will be able to collect enough reliable data to write a scientific report in the end. Purely monitoring or inventory projects will not be accepted.

Form of tuition
Research project, under supervision of VU-staff.

Type of assessment
Within six weeks after the start of the internship a Go/No Go evaluation is made by the VU supervisor. The aim of this interim evaluation is to decide whether the project and the student both have enough potential to continue (Go) or not (No Go). This evaluation is based on:
• Written material by the student, including a final research proposal and either the Introduction or Methods section of the article or both.
• Attitude of the student and execution of the project during the initial stage.

The final assessment of the internship is undertaken by the VU-supervisor and the second assessor.
In the final assessment, the VU supervisor assesses four different aspects of the internship:
• the attitude of the student
• the execution of the research
• the final report/article
• the oral presentation
The second assessor provides an assessment of the final report only.

The final report counts for 50% of the final grade, the oral presentation for 25% and the execution of the research also for 25%. Only if marks for each item given by the VU-supervisor and the second assessor are 6 or higher and the attitude is a 'pass', the internship is regarded as sufficient. The final grade is calculated from the marks given by both assessors and, together with other administrative details, is summarized in the final assessment form, done by the master's coordinator.

Entry requirements
The student is enrolled in the Master's programme Biology of which the internship is part and has gained at least 18 ECTS from the specialization programme.

The second internship can only start after the first internship has been fully completed.

Target group

Students from the MSc Biology to specialize in Brain and Behaviour

Registration procedure
Every research project has to be approved by the masters' coordinator in advance (on behalf of the examination board). The Placement Manual describes the process of completing the internship from the beginning (the admission) through the actual execution with its supervision to the final stage (assessment and grading) in consecutive order. The various stages of the process will be supported by forms which are supplied in the appendices or in links. Please see the placement manual on Blackboard (ALW_BMW_9999_01: Master Programmes Biomedical Sciences and Biology).

Remarks
The Placement Manual is based upon the 'Student Placement (Internship) and Research Project Regulations' of the Faculty of Earth and Life Sciences (FALW). Detailed information can be found in the Placement manual Biology on Blackboard (ALW_BMW_9999_01: Master Programmes Biomedical Sciences and Biology) and in the Academic and Examination Regulations (AER).

Duration of the internship is 5 months (30 EC) and may, under certain circumstances, be elongated to 33 or 36 EC (see AER and/or Placement manual).

It is not allowed for your literature thesis and internships to take place on the same or on a highly similar subject.

Internship Communication Specialisation

Course code	AM_471148 ()
Credits	30.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	dr. J.F.H. Kupper
Examinator	dr. J.F.H. Kupper
Level	600

Course objective
The internship is a compulsory part of the Master's programme. The aims of the internship are:
• Learn to independently apply and expand your practical science communication skills in one particular area of the field (writing, multi-media, facilitation, policy and strategy development, content design, etc.).
• Critical self-assessment and reflection on acquired science communication competencies in the field.
• Conduct scientific research independently: assess scientific information, design a research project, apply scientific methods, collect data, report and discuss findings.
• Present and discuss about internship and research outcomes.
• Learn to cooperate with researchers and practitioners of various disciplines.
• Gain an impression of a potential future field of career.

Course content
When you are enrolled in the VU Science Communication specialization or the UvA Major Science Communication you need to conduct one internship (30 ECTS, 5 months). MPA students that choose the Science Communication specialization also need to do at least one internship (30 ECTS, 5months) in the Science Communication field. The internship has two possible formats: the full Research Internship and the Reflective Practice Placement (RPP). The complete and up-to-date information about the internship can be found in the SC internship guide line on blackboard (science communication community).

Form of tuition
Work placement, under supervision of VU-staff.

Type of assessment
Within six weeks after the start of the internship a Go/No Go evaluation is made by the VU supervisor. The aim of this interim evaluation is to decide whether the project and the student both have enough potential to continue (Go) or not (No Go). This evaluation is based on:
• Written material by the student, including a final research proposal and either the Introduction or Methods section of the article or both.
• Attitude of the student and execution of the project during the initial stage.

The final assessment of the internship is undertaken by the VU-supervisor and the second assessor.
In the final assessment, the VU supervisor assesses four different aspects of the internship:
• the attitude of the student
• the execution of the reflective pratice placement
• the final report/article
• the oral presentation
The second assessor provides an assessment of the final report only.

The final report counts for 50% of the final grade, the oral presentation for 25% and the execution of the research also for 25%. Only if marks for each item given by the VU-supervisor and the second assessor are 6 or higher and the attitude is a ‘pass’, the internship is regarded as sufficient. The final grade is calculated from the marks given by both assessors and, together with other administrative details, is summarized in the final assessment form, done by the master's coordinator.

Entry requirements
The student is enrolled in the Master’s programme Biology of which the internship is part.
The student has passed the following courses:
AM_470582, Qualitative and Quantitative Research Methods
AM_470587, Science and Communication
And the student has acquired 6EC of the following courses:
AM_470572, 6EC, Communication, Organization and Management
AM_1002, 6EC, Science in Dialogue
AM_471014, 6EC, Science Journalism
AM_470590, 6EC, Science Museology

The second internship can only start after the first internship has been fully completed.

Target group
Students from the MSc Biology to specialize in Communication

Registration procedure
The research proposal is approved by the placement coordinator and the VU-supervisor, after which the application has to be approved by the masters' coordinator in advance (on behalf of the examination board).
The Placement Manual describes the process of completing the internship from the beginning (the admission) through the actual execution with its supervision to the final stage (assessment and grading) in consecutive order. The various stages of the process will be supported by forms which are supplied in the appendices or in links. Please see the placement manual on Blackboard (ALW_BMW_9999_01: Master Programmes Biomedical Sciences and Biology).

Remarks
The Placement Manual is based upon the 'Student Placement (Internship) and Research Project Regulations' of the Faculty of Earth and Life Sciences (FALW). Detailed information can be found in the Placement manual Biology on Blackboard (ALW_BMW_9999_01: Master Programmes Biomedical Sciences and Biology) and in the Academic and Examination Regulations (AER).

Internship Ecology

Course code	AM_471150 ()
Period	Ac. Year (September)
Credits	30.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	dr. R.J. van Belle-van den Berg
Examinator	dr. R.J. van Belle-van den Berg
Level	600

Course objective
The internship is a compulsory part of the Master's programme and involves many different aspects, such as theoretical preparation, practical execution, literature survey, report writing, oral presentation, and participation in the scientific activities of a research department.

The internship should be related to Ecology.

At the end of the internship a scientific report of the work has to be written as well as an oral presentation given.

For more (detailed) information, please see the placement manual on Blackboard (ALW_BMW_9999_01: Master Programmes Biomedical Sciences and Biology)

Course content
The internship is a compulsory part of the Masters' programme in Biology.
The internship has to be preceded by a research proposal. During the internship, you collect your data and you do the final analysis. Finally

you present your findings both orally and in a report.

Internships can be done at various locations, but should be part of an academical or research institute. Projects at academical or research institutes outside the Netherlands are also accepted, provided they are of sufficient academic quality and adequate on-site supervision is guaranteed. In all cases: take care that you will be working on research related to your specialization and that you will be able to collect enough reliable data to write a scientific report in the end. Purely monitoring or inventory projects will not be accepted.

For research projects in the Ecology department check the website: www.falw.vu.nl/nl/onderzoek/ecological-sciences/internships-at-the-institute. If you want to do a project outside the VU you may look for internships at the websites of other Dutch universities or research institutes, for example: NIOO (fundamental ecological research), NIOZ (marine ecology), IMARES (fisheries and sea research), ALTERRA (applied and environmental ecology), RIVM (applied and environmental ecology), SOVON (avian ecology), but also at the sites of nature conservation organisations such as Natuurmonumenten, Staatsbosbeheer, or regional authorities (Provincie) and drinking-water producing companies.

Form of tuition
Research project, under supervision of VU-staff.

Type of assessment
Within six weeks after the start of the internship a Go/No Go evaluation is made by the VU supervisor. The aim of this interim evaluation is to decide whether the project and the student both have enough potential to continue (Go) or not (No Go). This evaluation is based on:
• Written material by the student, including a final research proposal and either the Introduction or Methods section of the article or both.
• Attitude of the student and execution of the project during the initial stage.

The final assessment of the internship is undertaken by the VU-supervisor and the second assessor.
In the final assessment, the VU supervisor assesses four different aspects of the internship:
• the attitude of the student
• the execution of the research
• the final report/article
• the oral presentation
The second assessor provides an assessment of the final report only.

The final report counts for 50% of the final grade, the oral presentation for 25% and the execution of the research also for 25%. Only if marks for each item given by the VU-supervisor and the second assessor are 6 or higher and the attitude is a ‘pass’, the internship is regarded as sufficient. The final grade is calculated from the marks given by both assessors and, together with other administrative details, is summarized in the final assessment form, done by the master's coordinator.

Entry requirements
The student is enrolled in the Master’s programme Biology of which the internship is part and has gained at least 18 ECTS from the programme.

The second internship can only start after the first internship has been

fully completed.

Target group
Students from the MSc Biology to specialize in Ecology

Registration procedure
Every research project has to be approved by the masters' coordinator in advance (on behalf of the examination board). The Placement Manual describes the process of completing the internship from the beginning (the admission) through the actual execution with its supervision to the final stage (assessment and grading) in consecutive order. The various stages of the process will be supported by forms which are supplied in the appendices or in links. Please see the placement manual on Blackboard (ALW_BMW_9999_01: Master Programmes Biomedical Sciences and Biology).

Remarks
The Placement Manual is based upon the 'Student Placement (Internship) and Research Project Regulations' of the Faculty of Earth and Life Sciences (FALW). Detailed information can be found in the Placement manual Biology on Blackboard (ALW_BMW_9999_01: Master Programmes Biomedical Sciences and Biology) and in the Academic and Examination Regulations (AER).

Duration of the internship is 5 months (30 EC) and may, under certain circumstances, be elongated to 36 EC (see AER and/or Placement manual).

It is not allowed for your literature thesis and internships to take place on the same or on a highly similar subject.

Internship Green Life Sciences

Course code	AM_1107 ()
Credits	30.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Level	600

Course objective
The internship is a compulsory part of the Master's programme and involves many different aspects, such as theoretical preparation, practical execution, literature survey, report writing, oral presentation, and participation in the scientific activities of a research department.

The internship should be related to Green Life Sciences.

At the end of the internship a scientific report of the work has to be written as well as an oral presentation given.

For more (detailed) information, please see the placement manual on Blackboard (ALW_BMW_9999_01: Master Programmes Biomedical Sciences and Biology)

Course content

The internship is a compulsory part of the Masters' programme in Biology.
The internship has to be preceded by a research proposal. During the internship, you collect your data and you do the final analysis. Finally you present your findings both orally and in a report.

Internships can be done at various locations, but should be part of an academical or research institute. Projects at academical or research institutes outside the Netherlands are also accepted, provided they are of sufficient academic quality and adequate on-site supervision is guaranteed. In all cases: take care that you will be working on research related to your specialization and that you will be able to collect enough reliable data to write a scientific report in the end. Purely monitoring or inventory projects will not be accepted.

Form of tuition
Research project, under supervision of VU-staff.

Type of assessment
Within six weeks after the start of the internship a Go/No Go evaluation is made by the VU supervisor. The aim of this interim evaluation is to decide whether the project and the student both have enough potential to continue (Go) or not (No Go). This evaluation is based on:
• Written material by the student, including a final research proposal and either the Introduction or Methods section of the article or both.
• Attitude of the student and execution of the project during the initial stage.

The final assessment of the internship is undertaken by the VU-supervisor and the second assessor.
In the final assessment, the VU supervisor assesses four different aspects of the internship:
• the attitude of the student
• the execution of the research
• the final report/article
• the oral presentation
The second assessor provides an assessment of the final report only.

The final report counts for 50% of the final grade, the oral presentation for 25% and the execution of the research also for 25%. Only if marks for each item given by the VU-supervisor and the second assessor are 6 or higher and the attitude is a 'pass', the internship is regarded as sufficient. The final grade is calculated from the marks given by both assessors and, together with other administrative details, is summarized in the final assessment form, done by the master's coordinator.

Entry requirements
The student is enrolled in the Master's programme Biology of which the internship is part and has gained at least 18 ECTS from the programme.

The second internship can only start after the first internship has been fully completed.

Target group
Students from the MSc Biology to specialize in Green Life Sciences

Registration procedure

Every research project has to be approved by the masters' coordinator in advance (on behalf of the examination board). The Placement Manual describes the process of completing the internship from the beginning (the admission) through the actual execution with its supervision to the final stage (assessment and grading) in consecutive order. The various stages of the process will be supported by forms which are supplied in the appendices or in links. Please see the placement manual on Blackboard (ALW_BMW_9999_01: Master Programmes Biomedical Sciences and Biology).

Remarks
The Placement Manual is based upon the 'Student Placement (Internship) and Research Project Regulations' of the Faculty of Earth and Life Sciences (FALW). Detailed information can be found in the Placement manual Biology on Blackboard (ALW_BMW_9999_01: Master Programmes Biomedical Sciences and Biology) and in the Academic and Examination Regulations (AER).

Duration of the internship is 5 months (30 EC) and may, under certain circumstances, be elongated to 36 EC (see AER and/or Placement manual).

It is not allowed for your literature thesis and internships to take place on the same or on a highly similar subject.

Internship Science in Society

Course code	AM_1134 ()
Period	Ac. Year (September)
Credits	30.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	dr. T.J. Schuitmaker-Warnaar
Examinator	dr. T.J. Schuitmaker-Warnaar

Course objective
The aim of the internship as part of the Major Science in Society (societal specialisation) is to apply the competences acquired during the previous courses in a research project in order to ground the knowledge, attitudes and skills of interdisciplinary research. More specifically, the aims of the internships are:
• The student learns to independently conduct scientific research.
• The student is able to independently find scientific information and to evaluate this for the benefit of his or her own research question.
• The student is able to apply scientific methods and knowledge, to answer research questions and to generate evidencebased knowledge.
• The student is able to formulate a research question, to choose, to implement and to evaluate the (appropriate) research method, and to phrase the obtained results in report.
• The student is able to cooperate with researchers of various disciplines.
• The student is able to orally present the research results and to discuss the findings.
• The student obtains a good impression of a potential future field of career.

Course content
The internship is a compulsory part of the one year specialisation as part of the regular master. The duration of the internship is 5 months (30 EC). An internship placement must provide the student with the opportunity to learn how to conduct research under supervision. The onsite supervisor of the internship is linked to an academic or research institution.

Internships can be done at various locations such as the Ministry of Health, Welfare and Sports, the Public Health Inspectorate, the Health Council, medical organizations such as the municipality health service (GGD), consultancies, the (pharmaceutical) industry and several research institutes, such as universities or e.g. the National Institute for Public Health and the Environment (RIVM).

An internship typically has three phases

• In the first phase, you write your research proposal consisting of an introduction, background, theoretical/conceptual framework, research questions and your research methodology.
• In the second phase, you collect your (qualitative and/or quantitative) data.
• In the third phase, you do your final analysis and present your findings both orally and in a report. The presentation seminar is a compulsory part of this third phase.

Form of tuition
Research internship

Type of assessment
Report (55%), Oral presentation (15%), Execution (30%) and Attitude (Pass/fail)

Within six weeks after the start of the master internship, an interim evaluation will take place to assess whether there is a reasonable chance of the placement being brought to a successful completion.

The internship is supervised and assessed by two lecturers. Both lecturers are members of the academic staff at VU University Amsterdam. The onsite supervision can be carried out by a trainee research assistant (AIO), postdoc or researcher.

Entry requirements
To ensure that students do have enough background knowledge, it is required that you have passed the three compulsory courses: ‘Qualitative and Qualitative Research Methods’, ‘Communication Organization and Management’, and ‘Analysis of Governmental Policy’ (grade at least 6).

Target group
Students Major Science in Society

Registration procedure
Internships can only start when the draft research proposal and application and agreement form is approved and signed by the specialization coordinator.

Remarks

The placement may be extended by 6 EC, subject to conditions that can be found in the FALW document "Student placement (internship) and literature regulations". The student must send a request for extension to the Examination Board.

Information on internships is made available on Blackboard.

Internship Societal Specialisation

Course code	AM_471147 ()
Period	Ac. Year (September)
Credits	30.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	dr. R.J. van Belle-van den Berg
Examinator	dr. R.J. van Belle-van den Berg
Level	600

Masterclasses in Ecology and Evolution

Course code	AM_1016 ()
Period	Ac. Year (September)
Credits	3.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	prof. dr. J. Ellers
Examinator	prof. dr. J. Ellers
Teaching method(s)	Lecture, Seminar
Level	400

Course objective
To obtain a broad overview of the latest research in ecology and evolution
- To learn to critically evaluate scientific research articles
- To practice skills of scientific argumentation and discussion
- Learning to discuss these topics with leading scientists in the field

Course content
Being able to participate in discussion is an important skill for scientists. It requires the ability to combine theoretical and empirical knowledge as well as a critical view on the arguments put forward by others. The best way to improve these skills is to practice them under supervision of senior scientists. In this course students are trained to discuss the important topics in Ecology and Evolution with top scientists in the world, in the form of a masterclass (described below). In doing so, students will attend seminars from these internationally renowned scientists in the Nature of Life meetings organized by the Institute of Ecological Sciences (VU) and in the series of IBED lectures organized by the Institute for Biodiversity and Ecosystem Dynamics (UvA). Both series are organized on a monthly basis throughout the year (except the summer period). The topics for the seminars cover the whole

spectrum of ecology and evolution. An overview of upcoming and previous seminars can be found at www.falw.vu.nl/nl/onderzoek/ecological-sciences/nature-of-life-meetings/index.asp and www.science.uva.nl/ibed-agenda/see.cfm. Students must attend six masterclasses during the 2-year programme. Students may attend more theme lectures on a facultative basis, subject to availability.

Form of tuition
In preparation for each masterclass, several recent papers by the guest speaker will be studied and extensively discussed during a tutorial meeting with staff members of the Institute of Ecological Sciences or of the Institute for Biodiversity and Ecosystem Dynamics. Students then participate in a discussion meeting with the speaker (the actual masterclass), and finally they attend the seminar as part of the course. Students are required to participate actively in the discussion during the tutorials, masterclass and the seminar. The total number of contact hours (including lectures and discussions) is 30, the remaining time is spent on preparation.

Type of assessment
Factors which count for the final grade:
For each masterclass: active participation, theoretical insight, and argumentation of the students in the tutorial meeting, masterclass and seminar: 100%
Students pass after 6 satisfactorily participated masterclasses.

Course reading
Primary literature and recent articles by the guest speakers, to be announced at least one week before each masterclass.

Entry requirements
BSc Biology from a Dutch University. Students with a BSc in Earth Sciences, Social Geography, Beta/Gamma, and international BA's with Nuffic accreditation can be admitted, but extra elements can be obligatory.

Target group
Master students in Biology and Ecology (from both the Ecology and Evolution as well as the Environmental Chemistry and Toxicology specializations) at the VU and master students from the Biological Sciences specialization Ecology and Evolution at the UvA.

Remarks
Location: VU University Amsterdam, De Boelelaan 1085 Amsterdam and University of Amsterdam, Science Park 904 Amsterdam

Methods in Behavioral Neurosciences

Course code	AM_470728 ()
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	dr. R.O. Stiedl
Examinator	dr. R.O. Stiedl
Level	500

Course objective
The course will give an overview of methods, the behavior tests and its measures, used in a number of different research areas in behavioural neuroscience and the interpretation of these data. It will provide a critical overview on behavioral phenotyping aspects of mice and rats used in biomedical research as models for human disorders/disease. The course aims to develop critical thinking about interpretations of animal behavior.

The course will include a practical in week 2 to generate data that will be converted into a joint manuscript by all course participants by splitting up the different tasks. The course will also expose to the evaluation procedure of manuscripts as an important part of the review process for publication of scientific data.

Course content
In behavioral neuroscience we study how different brain areas are involved in the control and execution of behavior. Importantly, the methods used have to capture important aspects of the normal behavior of the animal. In order to obtain results that are both reproducible and reliable it is important to that the methods used are standardized and that there is agreement on what the measures actually mean (its interpretation).

Questions that we will address are:
1) How can we record animal behavior in a reproducible fashion?
2) Which test assays and behavioral parameters are important and which brain areas are involved?
3) How do we analyze the data that we have obtained?
4) Can the results be interpreted unambiguously?
5) What are the pros and cons of currently used behavior assays?

The following topics will be covered to better understand and judge the behavior test spectrum and its use in behavioral phenotyping:

- Standardization of behavior tests
- Classical and novel tests and measures of anxiety and fear
- Telemetry and optogenetics in behavioral neuroscience
- Autonomic functions in behavior as index of emotion
- Home cage-based phenotyping of mice
- Spatial learning tests in rodents: clues and pitfalls
- Neural aspects of spatial orientation

The overall course focus will be on emotional and cognitive aspects of behavior.

Form of tuition
Lectures, partly with demonstrations, and discussion based on primary research papers. Individual and group work for the preparation os a manuscript.

Type of assessment
1) Student presentation related to the course topics (20%)
2) Written chapters for the jointly prepared manuscript (40%)
3) Written examination with open-ended questions (40%)
In all three assessment forms the minimal grade has to be 5.5 to pass the course.

Course reading
Primary literature (papers) generally provided through digital blackboard.

Entry requirements
Basic knowledge of animal behavior.

Target group
MSc. Biology and MSc. Neuroscience students

Microbial Ecology

Course code	AMU_0008 ()
Period	Ac. Year (September)
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen

Course content
http://studiegids.uva.nl/xmlpages/page/2015-2016/zoek-vak/vak/14424

Registration procedure
This course is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-science@uva.nl, +31 (0)20 525 7100.
Enrolment via https://m.sis.uva.nl/vakaanmelden is required.

Neuronal Networks in Vivo

Course code	AM_1001 ()
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	dr. C.P.J. de Kock
Examinator	dr. C.P.J. de Kock
Teaching staff	dr. C.P.J. de Kock
Teaching method(s)	Study Group, Practical
Level	600

Course objective
The aim of this exciting course is to provide insight into the most intricate
neuronal network of the brain – the cortical microcircuit. You will learn the basic
floor plan of the cortex and find out the function of different layers and multiple cell types. As the course title suggests, all topics will be addressed from the in vivo perspective which aims to combine cortical function with animal behaviour. You will get hands-on experience in in vivo experiments, data analysis and how to identify different types of cortical neurons.

Course content
The course starts with plenary lectures on cortical circuitry and on recent advances to study the properties of cortical networks. These advances involve in vivo imaging and electrophysiological techniques that are applied in anaesthetized and awake animals. The lectures will gradually merge into a master class setting where you will work on a methods-thesis and a mini-thesis. In the methods thesis (individual ppt) you will highlight a recently developed (in vivo) technique and discuss the advantages and disadvantages. In the mini-thesis (duo-setting, pdf and ppt) you will review two experimental papers (from a pre-selected or self-chosen set) and write a critical evaluation. In addition, the course will feature demonstrations of in vivo experiments, practical (histological) work and will be concluded with a workshop where you learn how to discriminate and recognize different cortical cell types using real rat, mouse and human brain slices.

Form of tuition
Lectures 16 hours 31% 1.9 ECTS
Demo’s in vivo experiments 16 hours 31% 1.9 ECTS
Histology workshop 8 hours 15% 0.9 ECTS
Cell identific. workshop 2 hours 4% 0.2 ECTS
Final presentations 10 hours 19% 1.1 ECTS

Total 52 hours 100% 6.0 ECTS

Type of assessment
1) Written exam

2) Presentation on an in vivo methods.

3) Written thesis (5 pages) on an in vivo topic, accompanied by a presentation. The topic can fall into three catagories: 1) a "hot" current topic in the field. 2) the topic covers a set of papers with conflicting outcomes or 3) the topic covers similar outcomes with different in vivo approaches.

Final grading depends on Exam (25%), Methods presentation (25%), Written topic thesis (25%), and Topic presentation (25%). All components have to be passed.

Course reading
Oberlaender et al, Cereb Ctx 2012
Narayanan et al, Cereb Ctx 2015
Markram et al, Nat.Neurosci 2006
Hill et al, PNAS 2012

Target group
Master of Neuroscience students of VU University Amsterdam or other universities. The course is optional for all Master of Neuroscience tracks.

Remarks
Guest Lecturers:
Hemanth Mohan, MSc, FALW
Roel de Haan, MSc, FALW
Anton Pieneman, FALW
Keerthi Kumar, MSc FALW
Antonio Luchicci, Dr. FALW

Peergroup 1

Course code	O_MLPEERGR_1 ()
Period	Period 1+2+3, Period 4+5+6
Credits	0.0
Language of tuition	Dutch
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. A. Handelzalts
Examinator	dr. A. Handelzalts
Teaching method(s)	Study Group
Level	400

Peergroup 2

Course code	O_MLPEERGR_2 ()
Period	Period 3+4+5
Credits	0.0
Language of tuition	Dutch
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. A. Handelzalts
Examinator	dr. A. Handelzalts
Teaching method(s)	Study Group

Policy, Politics and Participation

Course code	AM_470589 ()
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	dr. R.M. Edelenbosch MSc
Examinator	dr. R.M. Edelenbosch MSc
Teaching staff	dr. B.J. Regeer, dr. J.F.H. Kupper, prof. dr. J.E.W. Broerse
Teaching method(s)	Lecture, Study Group
Level	500

Course objective

To further deepen your analytic skills with respect to the assessment of a specific societal problem;
To acquire further insight into the practice of interactive research;
To acquire further insights into specific methods and techniques of interactive research;
To strengthen the skills to design an interactive research project
To practice skills in data collection and analysis;
To learn to set up valid lines of argumentation;

To improve your communication skills;
To improve your skills in working effectively in a project team, through team building, team analysis and feedback.

Course content
In this course you get the chance to gain experience in the practical implementation of methodologies for interactive research. In a four week policy project you will both improve your focus group research skills and deepen your understanding of the relevant theoretical concepts in the areas of policy studies, science and technology studies and democracy theory. In a group of about ten students you will participate in a real interactive research project which is executed at the Athena institute. In this project you will be trained in and practice various skills for data collection (such as focus group design and facilitation) and data analysis (such as qualitative content analysis).
Specific attention is paid to your personal interactive research skills. At the end of the course, you prepare a policy report to present your findings. In an oral presentation your team will highlight the main results of your analysis and defend the recommendations you propose.

Form of tuition
Lectures: 14 hours
Training workshops: 4 hours
Project assignment: 102 hours
focus group execution: 6 hours
Final presentations project results: 4 hours
Self study: remaining hours

Type of assessment
The course does not have an oral or written exam. You will be assessed on the basis of the group assignment, a group presentation and on your individual performance during the course (in the work groups, your facilitation skills in the ‘real’ focus groups). For all parts a pass grade (> 5.5) needs to be obtained in order to receive a final mark.

Your final mark will be based on: the group report (40%): oral presentation per group(40%): individual performance (20%).

Course reading
To be announced on Blackboard

Entry requirements
Basic knowledge of (interactive) policy processes, policy analysis and relevant research skills are required.

Target group
Optional course for Master students Management, Policy Analysis and Entrepreneurship in Health and Life sciences (MPA), Societal differentiation of the Health, Life & Natural Sciences.

Registration procedure
Registration deadline by VUnet is 4 weeks before the start of the course.

Remarks
As the project depends on team work, attendance is compulsory.

Praktijk 1

Course code	O_MLPRAK_1 ()
Period	Period 1, Period 4
Credits	6.0
Language of tuition	Dutch
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. A. Handelzalts
Examinator	dr. A. Handelzalts
Teaching staff	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, ir. E.J.F. Scheringa, drs. W.S. Hoekstra, drs. C.D.P. van Oeveren, drs. S. Donszelmann, drs. L.J. van Well-van Grootheest, dr. H.B. Westbroek, C.L. Geraedts, drs. A. Krijgsman, dr. A.A. Kaal, dr. A. Handelzalts, drs. K.L. Schaap, W. Maas, F.L. de Vries MSc, drs. H. Stouthart, drs. I. Pauw
Teaching method(s)	Study Group
Level	400

Praktijk 2

Course code	O_MLPRAK_2 ()
Period	Period 2+3, Period 5+6
Credits	9.0
Language of tuition	Dutch
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. A. Handelzalts
Examinator	dr. A. Handelzalts
Teaching staff	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, ir. E.J.F. Scheringa, drs. W.S. Hoekstra, drs. C.D.P. van Oeveren, drs. S. Donszelmann, dr. H.B. Westbroek, C.L. Geraedts, drs. A. Krijgsman, dr. A.A. Kaal, dr. A. Handelzalts, drs. K.L. Schaap, W. Maas, F.L. de Vries MSc, drs. H. Stouthart, drs. I. Pauw
Teaching method(s)	Study Group
Level	400

Praktijk 3

Course code	O_MLPRAK_3 ()
Period	Period 4+5+6
Credits	15.0
Language of tuition	Dutch
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. A. Handelzalts
Examinator	dr. A. Handelzalts

Teaching staff	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, ir. E.J.F. Scheringa, drs. W.S. Hoekstra, drs. C.D.P. van Oeveren, drs. S. Donszelmann, dr. H.B. Westbroek, C.L. Geraedts, drs. A. Krijgsman, dr. A.A. Kaal, dr. A. Handelzalts, drs. K.L. Schaap, W. Maas, F.L. de Vries MSc, drs. H. Stouthart, drs. I. Pauw
Level	400

Praktijk onderzoek 1

Course code	O_MLPROZ_1 ()
Period	Period 3, Period 6
Credits	3.0
Language of tuition	Dutch
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. H.B. Westbroek
Examinator	dr. H.B. Westbroek
Teaching staff	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, ir. E.J.F. Scheringa, dr. M. Meeter, drs. W.S. Hoekstra, drs. C.D.P. van Oeveren, drs. S. Donszelmann, drs. B. Klein, drs. W. Jongejan, drs. L.J. van Well-van Grootheest, dr. T. Bosma, dr. H.B. Westbroek, C.L. Geraedts, drs. A. Krijgsman, dr. J.M.H. Swennen, dr. A.A. Kaal, dr. A. Handelzalts, drs. K.L. Schaap, W. Maas, F.L. de Vries MSc, drs. H. Stouthart, drs. I. Pauw
Teaching method(s)	Study Group, Lecture
Level	400

Praktijk onderzoek 2

Course code	O_MLPROZ_2 ()
Period	Period 4+5+6
Credits	6.0
Language of tuition	Dutch
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. H.B. Westbroek
Examinator	dr. A. Handelzalts
Teaching staff	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, ir. E.J.F. Scheringa, dr. M. Meeter, drs. W.S. Hoekstra, drs. C.D.P. van Oeveren, drs. S. Donszelmann, drs. B. Klein, drs. W. Jongejan, drs. L.J. van Well-van Grootheest, dr. T. Bosma, dr. H.B. Westbroek, C.L. Geraedts, dr. J.M.H. Swennen, dr. A.A. Kaal, dr. A. Handelzalts, drs. K.L. Schaap, W. Maas, F.L. de Vries MSc, drs. H. Stouthart, drs. I. Pauw
Teaching method(s)	Lecture, Seminar
Level	400

Research I

Course code	O_MLVPOOI ()
Period	Period 1+2+3
Credits	3.0
Language of tuition	Dutch
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. A. Handelzalts
Examinator	dr. A. Handelzalts
Teaching staff	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, drs. I. Pauw, drs. W.S. Hoekstra, drs. C.D.P. van Oeveren, drs. S. Donszelmann, drs. W. Jongejan, dr. H.B. Westbroek, C.L. Geraedts, drs. A. Krijgsman, prof. dr. J.J. Beishuizen, dr. A.A. Kaal, drs. K.L. Schaap, W. Maas, F.L. de Vries MSc, drs. H. Stouthart
Teaching method(s)	Lecture, Seminar
Level	500

Research II

Course code	O_MLVPOOII ()
Period	Period 1+2+3
Credits	6.0
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. H.B. Westbroek
Examinator	dr. H.B. Westbroek
Teaching staff	drs. W. Jongejan, dr. T. Bosma, dr. H.B. Westbroek, dr. A.A. Kaal, dr. A. Handelzalts, W. Maas
Teaching method(s)	Lecture, Seminar
Level	500

Research methods for analyzing complex problems

Course code	AM_1182 ()
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	dr. M.E. Arentshorst MSc
Examinator	dr. M.E. Arentshorst MSc
Teaching method(s)	Lecture, Seminar, Computer lab
Level	400

Course objective
The objectives of this course are:

- To understand the differences between beta- and gamma research;
- To acquire insight in and understanding of a real world research

process, including knowledge of the character of complex societal issues and the needs, advantages and disadvantages of real world research;
- To acquire insight into various quantitative and qualitative research methods, their underlying theoretical concepts and their relative strengths and weaknesses;
- Being able to apply these various quantitative and qualitative research methods in a specific societal context;
- To interpret quantitative and qualitative findings;
- Being able to create an adequate research design for the investigation of a specific complex societal problem.

Course content
Contemporary societies increasingly face complex social problems, such as climate change, HIV/ AIDS or ethnic and religious diversity. These complex problems involve a variety of social actors: policy-makers, professionals, NGOs, industries, science and, of course, the public at large. Addressing these complex issues demands an approach that investigates, analyzes and integrates the positions and knowledge of different actors.

This course offers an (advanced) introduction to various research methods used in real world research, including questionnaires, systematic observations, surveys and statistics, semi-structured interviews, and focus groups. These methods are commonly used in research into complex problem contexts, communication and opportunities for intervention. Strengths and weaknesses of each research method and technique will be discussed, as well as its possibility to be applied in different societal contexts.

Form of tuition
Research Methods for Analyzing Complex Problems is a fulltime course of four weeks (6 ECTS). The total study time is 160 hours. Tuition methods include lectures, workgroups, workshops, group project work and self-study.

The different elements have the following study time:
- lectures 20 hours
- workgroups and training 36 hours
- examination 3 hours
- project work & reading (self-study) Remaining hours

Please note that attendance to the workgroup sessions is compulsory. If you miss one workgroup, with a good reason, you will receive an additional assignment. If you miss more than one workgroup session it is no longer possible to pass the project part of the course.

Attendance to the lectures is highly recommended. In our experience, relying on self-study alone is insufficient to apply the theory of the lectures in the assignments of the workgroups, and to pass the exam.

Type of assessment
The course grade is based on the group assignment 'study design' and the exam. Both aspects need to be graded 6.0 or higher.

Exam 50% of total grade
Group assignment 'study Design' 50% of total grade

Course reading

The literature of this course consists of selected scientific articles that are provided on blackboard, and the books:
- Verschuren, D.E. and Doorewaard, H. (2010). Designing a Research Project
(2nd edition)Eleven International Publishing, the Hague. ISBN 978-90-5931-572-3.
- Gray, D.E. (2014) Doing Research in the Real World (3rd edition)Sage Publications Ltd, United Kingdom. ISBN 978-1-4462-6019-7

An overview of the literature per lecture will be provided on blackboard.

Target group
The course 'Research Methods for Analyzing Complex Problems' is a compulsory course for first year master students 'Management, Policy Analysis and Entrepreneurship in Health and Life Sciences'. This course is also a compulsory course within the Science communication- and Societal differentiations of Health, Life and Natural Sciences Master programmes. It is an optional course for other Life Sciences Master program students at the VU University.

Registration procedure
VUnet

Remarks
Lectures are in English, part of the workgroups are in Dutch. The assignments are written in English.

Please note that attendance to the workgroup sessions is compulsory. If you miss one workgroup, with a good reason, you will receive an additional assignment. If you miss more than one workgroup session it is no longer possible to pass the project part of the course.

Attendance to the lectures is highly recommended. In our experience, relying on self-study alone is insufficient to apply the theory of the lectures in the assignments of the workgroups, and to pass the exam.

course coordinator: Marlous Arentshorst - m.e.arentshorst@vu.nl

Science and Communication

Course code	AM_470587 ()
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	P. Klaassen MA
Examinator	P. Klaassen MA
Teaching staff	dr. B.J. Regeer, dr. J.F.H. Kupper, drs. ir. M.G. van der Meij, P. Klaassen MA
Teaching method(s)	Lecture, Study Group
Level	500

Course objective
- Gain theoretical insight in the relationship between science and society,
- Gain insight in the role of science communication in this relationship,
- Acquire knowledge of different theories and models of science communication,
- Acquire knowledge of different strategies, media and activities for science communication,
- Learn how to apply theoretical concepts to real-life examples,
- Development of practical skills for science communication (e.g. writing, discussing).

Course content
Science is all around us and shapes our lives in many different ways. From the vaccines you need for travelling abroad, to the technological devices you use on a daily basis. At the same time, society shapes the development of science and technology. Science and society influence each other continuously; they communicate. Students of Science Communication are expected to become experts in understanding and designing interaction between science and society. In order for this interaction to be fruitful and valuable for both science and society, it is important to gain in-depth knowledge about the theoretical basis of the field of science communication and understand communication processes at the core of several interfaces; e.g. the communication between scientists from different disciplines, between different sciences and their stakeholders, and between science and the public. This course provides a broad basis in the field of science communication by addressing the main areas of science communication and by discussing and challenging several core concepts within this field. Students are invited to explore some issues in greater depth and active participation in lectures and workgroups is required.

Form of tuition
Lectures (22 h)
Workgroups (18 h)
Home-study for group assignments (8 h)
Home-study for individual assignments/exam (90h)

Type of assessment
Individual assignments (30%), group assignment (10%), examination (60%). For all parts a pass grade needs to be obtained.

Course reading
Academic articles. Direct links to articles will be provided on BlackBoard one month before the beginning of the course.

Target group
The course Science and Communication is a compulsory course for students of the Master specialisation Science Communication (Wetenschapscommunicatie) and is a prerequisite for the internship. Science and Communication is an optional course for students from other master programs in the health and life sciences.

Science in Dialogue

Course code	AM_1002 ()
Period	Period 2

Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	dr. J.F.H. Kupper
Examinator	dr. J.F.H. Kupper
Teaching staff	dr. J.F.H. Kupper
Teaching method(s)	Study Group, Lecture, Seminar
Level	500

Course objective
To gain knowledge of and insight into:
- the basic concepts and issues in the understanding of science-society interactions, both from a science and technology studies and communication science perspective
- the nature and course of interpersonal and group communication processes relevant to the formal and informal dialogue between science and society
- the nature and form of dialogical science communication, aimed at reflective learning and mutual understanding

To acquire or improve:
- individual skills for effective interpersonal communication
- individual skills for the design and facilitation of the science-society dialogue

Course content
This course examines the public character of scientific controversy and focuses on the communicative aspects of a fruitful science-society dialogue. At the dawn of the 21st century, science, and particularly fields that combine science and engineering such as nanotechnology and synthetic biology, holds a great promise for the progress of our societies. At the same time, these developments are controversial. They lead to a variety of concerns related to risks, benefits and wider moral issues. Nanotechnology creates materials with novel characteristics that help us, but may also contain risks for health and environment. Synthetic biology develops new biological systems that may be very useful, but radically change the nature and meaning of life. Clearly, advances in science do not always match the needs, desires and expectations of society. On the other hand, parts of society might not always appreciate the nature and scope of scientific findings. For a fruitful relationship between science and society, a constructive science-society dialogue is necessary.
This course offers advanced lectures on the basic concepts and issues of dialogical science communication: communication, learning, dialogue, understanding, controversy, democracy. A series of workshops and small group assignments presents communicative tools and spaces such as discussion games, science theatre and multimedia platforms that can be used to design and facilitate science-society interactions. Training workshops will focus on improving the students' individual communication and facilitation skills. The students' individual learning curve as a science communicator and facilitator is self-evaluated by means of a refle ction report.
Every course week is completed with a mini-exam.

Form of tuition

Lectures (14h), Workgroups (28h), Training workshops (24h), Dialogue presentations (12h), Selfstudy
(remaining hours)

Type of assessment
Group assignment (50%), Take home exam (30%), Reflection report (20%).
All assignments must be passed (grade > 6).

Course reading
Is announced on blackboard one month before start of the course

Target group
Optional course in the MSc specialization Science Communication

Remarks
Independence and a cooperative attitude is expected. Attendance to training workshops is mandatory.

Science Journalism

Course code	AM_471014 ()
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	dr. J.F.H. Kupper
Examinator	dr. J.F.H. Kupper
Teaching staff	dr. J.F.H. Kupper
Teaching method(s)	Lecture, Study Group, Computer lab
Level	500

Course objective
To acquire knowledge of and insight into:
- the concepts, models and issues of science journalism according to contemporary scientific literature
- the criteria for effective science journalism with respect to diverse media
- the representation of science in the media
- the role of science journalism in the use of scientific knowledge in society

To acquire skills in:
- writing popular scientific texts for different genres such as news, background and interview
- science reporting using videos
- designing science communication for different media such as newspaper, radio and internet

Orientation to the professional practice of science journalism

Course content
This course teaches the basic principles of science journalism. A series of interactive lectures reviews both the practical as well as the theoretical aspects of science journalism. Topics that are discussed are the translation of science to a language that is both compelling and

understandable, the role of journalism in the interaction between science and society, images of science in the media and the ethics of science journalism. The interactive lectures invite you to take your own defendable position with regard to these issues.
Guest lectures provide insight into the professional practice of science journalists. The guest speakers work as freelancer, editor or producer at diverse science media, such as newspapers (NRC, Volkskrant), magazines (NWT), internet (Noorderlicht) and radio (Labyrint).
Finally, the course trains specific skills that you need as a science journalist, such as popular writing, popular science videos, interviewing, conceptual analysis
and program design.

Form of tuition
Lectures and seminars on theory and practice of science journalism and writing skill training (36h). Considerable time is set aside for performing science journalism in assignments (108h). The assignments are assessed by lecturers and fellow students (peer-review process). Self study (remaining hours).

Type of assessment
Several individual assignments (60%), several small group assignments (40%). All assignments must be passed (grade > 6).

Course reading
Announced on Blackboard one month before start of the course

Target group
All Master students with a Beta-Bachelor degree. Students taking this course as part of their C-specialisation within FALW or FEW will have precedence over other students. Students from other faculties and or universities need to get formal consent from the course coördinator (Frank Kupper) before enrolment.

Remarks
Course is taught in Dutch. More information: f.kupper@vu.nl.

Science Museology

Course code	AM_470590 ()
Period	Period 3
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	dr. B.J. Regeer
Examinator	dr. B.J. Regeer
Teaching staff	dr. B.J. Regeer, drs. ir. M.G. van der Meij
Teaching method(s)	Lecture, Study Group, Seminar, Fieldwork
Level	500

Course objective
- Gain insight in the role of museum exhibits in the field of science communication.
- Gain insight in the role of science communication concepts in the context of science museums.

- Apply qualitative research methods to design, conduct, and report on a user research project in museum settings.
- Apply theoretical notions of science communication and exhibit design to advise development of exhibit experience and content design.
- Gain experience in working for an external commissioner.

Course content
This course is about the role of science museums/centers, zoos and natural history museums in science communication. You will get familiar with theories of science communication in museum settings, and will be introduced to different styles of communication, different approaches to exhibit design & development, and different methods of research and evaluation of exhibitions.
Guest speakers and lecturers give insight into their profession (1) as science communicators in museums and science centers, (2) as researchers in the field of museology, and/or (3) as professionals in informal science & technology learning environments.
Through individual and group assignments you are encouraged to combine theory and practice, working step-by-step towards (part of) an exhibition (re-)design. The group assignments are commissioned by museums and science centers, such as NEMO, Museon, Naturalis, Delft Science Centre, and Artis.

Form of tuition
Lectures
Workgroups
Workshops
Home-study for group assignments
Home-study for individual assignments
Field work

Type of assessment
Group assignment (50%), presentation (poster and oral) (10%), and individual exam(s) (40%). For the assignments, presentations and all exams a pass-grade must be obtained.

Course reading
Academic articles. Direct links to articles will be provided on Blackboard one month before the beginning of the course.

Entry requirements
It is possible to follow the course as an elective course outside of one of the science communication master specialisations of FALW/FEW. In that case additional reading may be required depending on the student's background.

Target group
Optional course in the Science Communication master specialisation of most of the two-year master programs of the FALW and FEW faculties. Master students from other universities in any scientific field are welcome as well. Additional reading may be required.

Remarks
Guest lectures from and excursions to for instance Artis, NEMO, Naturalis, NorthernLight, Museon, etc.

Soil-Plant-Animal Interactions

Course code	AM_470507 ()
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	prof. dr. M.P. Berg
Examinator	prof. dr. M.P. Berg
Teaching staff	prof. dr. M.A.P.A. Aerts, ing. R.S.P. van Logtestijn, prof. dr. J.H.C. Cornelissen, prof. dr. M.P. Berg, prof. dr. H.A. Verhoef
Teaching method(s)	Lecture, Practical, Study Group, Excursion, Fieldwork
Level	500

Course objective
Students will be able to:
- Underpin the importance of ecological interactions (trophic and non-trophic) between soil organisms-plants-aboveground fauna (and vice versa)
- Critically evaluate and investigate the relevant interactions between soil-soil organisms, soil-vegetation, soil organisms-vegetation, vegetation-herbivores (and vice versa)
- Critically evaluate and investigate the relevant functional traits that underlie ecological interactions between the soil-subsystem (brown web) and plant-subsystem (green web)
- In the field: apply different techniques to survey the soil-subsystem and plant-subsystem, and to sample soil and soil organisms
- In the laboratory: carry out ecological and biochemical analyses relevant to brown-green web interactions, with emphasis on organismal traits.

Course content
A hot theoretical topic in Ecology concerns the interdependency of the brown web (belowground) and green web (aboveground) compartments. This comprises key conceptual issues relating to interactions between brown and green communities, the importance of functional traits to understand these interactions within and between these communities, and the processes carried out by each component. These concepts can be applied to current
critical questions, such as the regulation and function of biodiversity, vegetation development, and consequences of human-induced global change, e.g. biological invasions, extinctions, nitrogen deposition, land use change and climate change.
In this course we will focus theoretically on the following subjects:
- The brown and green food web: biotic interactions and regulators
- Plant species and plant trait control of brown web interactions and processes
- Belowground consequences of green food web interactions
- Completing the circle: how brown web effects are manifested aboveground
- The regulation and function of biological diversity, with a focus on functional traits of plants, animals and microbes
- Global change phenomena in an aboveground-belowground context
These subjects are discussed in various papers (see literature) that will be used as the basic literature for the seminars given by the (guest) lecturers. In the second week, students will perform experiments on location (in Zevenaar, The Netherlands) where brown-green web interactions in subarctic ecosystems are currently being studied, with

emphasis on (a) design and statistical treatment of experiments on soil-plant-fauna interactions, (b) techniques to identify soil organisms and analyse soil processes, biochemistry and vegetation development.

Form of tuition
Individual performance in critical group discussions about important theory based on these papers/chapters, a preliminary presentation about the own research project, and a final presentation about background, design and (synthesis of) results of own research project.

Type of assessment
Individual performance in critical group discussions about important theory based on these papers/chapters, a preliminary presentation about the own research project, and a final presentation about background, design and (synthesis of) results of own research project.

Course reading
Selected literature will be made available via BB, which includes recent key papers in international journals and extracts from Richard D. Bardgett and David A.Wardle (2010): "Aboveground-Belowground Linkages; Biotic interactions, ecosystem processes, and global change". Oxford Series in Ecology and Evolution.

Entry requirements
To attend this course their will be costs involved. A part of the expenses for accommodation at Zevenaar have to be covered by the MSc-students themselves.

Target group
MSc students with focus on ecology.

Spatial Processes in Ecology

Course code	AMU_0009 ()
Period	Ac. Year (September)
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen

Course content
This is an UvA course. For the course description, please visit http://studiegids.uva.nl/

Specialisation

Course code	O_MLVERD ()
Period	Period 2+3
Credits	3.0
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. A. Handelzalts
Examinator	dr. A. Handelzalts

Teaching staff	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, drs. W.S. Hoekstra, drs. S. Donszelmann, dr. H.B. Westbroek, C.L. Geraedts, drs. A. Krijgsman, drs. K.L. Schaap, W. Maas, F.L. de Vries MSc, drs. H. Stouthart, drs. I. Pauw, drs. C.D.P. van Oeveren
Teaching method(s)	Seminar,
Level	500

System Neurosciences

Course code	AM_470712 ()
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	prof. dr. T.J. de Vries
Examinator	prof. dr. T.J. de Vries
Level	500

Course objective
- Understanding of approaches to study the central nervous system in an integrated and multidisciplinary way with a strong focus on how the complexity of the brain is required for complex behaviour.
- The ability to write a research proposal from a system neuroscience perspective

Course content
Systems Neurosciences is a "way of life": approaching the study of the central nervous system in an integrated and multidisciplinary way. Once learned in an exemplar system, the systems approach can be applied to essentially any functional system in the CNS. In this course we will restudy the organization of essential systems, such as the sensory and motor systems, associational systems, autonomic nervous system and hypothalamus, etc. This will to a large extent consist of textbook-based homework assignments with short presentations and discussion. The core of the course will take examples of systems involved in learning and memory, in particular those involved in declarative learning and memory. Based on selected review- type papers/chapters we will a) follow the development of concepts over time; b) discuss the relationship between technology-development and experimental approaches c) study and discuss different approaches and d) integrate those into a concept of systems neurosciences.

Form of tuition
Lectures, homework assignments, presentations, and tutored discussions.
Contact hours: 24
Selfstudy 48

Type of assessment
Self-study with evaluations by way of presentations and discussions; final thesis on a self-selected topic.

Course reading

Kandel ER, Schwartz JH, Jessell TM Principles of Neural Science, 2000, 4th edition, McGraw Hill, ISBN 0-07-112000-9. All chapters
This book will be used in the course as background literature and for a large part of self study assignments. Other literature will be provided during the course or will be self-selected.

Entry requirements
Principles of Neuroscience or similar advanced neuroscience course

Recommended background knowledge
Basic neuroscience

Remarks
Guest lecturers: Prof dr Kees Stam, Prof dr Cyriel Pennartz, Prof dr Jeroen Geurts, dr Ysbrand van der Werf, dr Jamie Peters, dr Matthew Self

Teaching Methodology Biology I

Course code	O_MLVDBII ()
Period	Period 1+2
Credits	3.0
Language of tuition	Dutch
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	C.L. Geraedts
Examinator	C.L. Geraedts
Teaching staff	C.L. Geraedts
Teaching method(s)	Seminar
Level	500

Teaching Methodology Biology II

Course code	O_MLVDBIII ()
Period	Period 1+2
Credits	6.0
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	C.L. Geraedts
Examinator	C.L. Geraedts
Teaching staff	C.L. Geraedts
Teaching method(s)	Seminar
Level	500

Teaching Practice I

Course code	O_MLPRAKI ()
Period	Period 1+2+3
Credits	15.0
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	ir. E.J.F. Scheringa

Examinator	ir. E.J.F. Scheringa
Level	500

Teaching Practice II

Course code	O_MLPRAKII ()
Period	Period 1+2+3
Credits	15.0
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	ir. E.J.F. Scheringa
Examinator	ir. E.J.F. Scheringa
Level	500