



Ecology MSc

Vrije Universiteit Amsterdam - Fac. der Aard- en Levenswetenschappen - M Ecology - 2013-2014

The aim of the Master programme Ecology is to provide you with the knowledge, skills and insight required to operate as an independent professional and to be a suitable candidate for a subsequent course of study leading to a career in Ecological research. After having completed the programme, you will have developed a critical scientific approach and an awareness of the ethical and societal aspects of Ecology.

The programme has two specialisations: 'Ecology and Evolution' and 'Environmental Chemistry and Toxicology'. These specialisations are organised in close cooperation with the University of Amsterdam (UvA). This implies that some (course) components will take place at the Science Park of UvA and others at the VU campus. In all courses teachers of both universities will be participating.

Each course is given at one or the other university, so teachers move between classes. In general elective courses are given every two years (except Adaptive Dynamics and Biodiversity and Landscapes that can be taken every year).

When registered in the MSc Ecology programme of the VU you will also automatically be registered as a 'bijvakstudent' at the UvA (similarly for UvA students). You will thus be assigned a VUnetID and a UvAnetID. You should enrol for VU (course) components at: vunet.vu.nl using your VUnetID and for UvA (course) components: <http://datanose.nl/#masterenrol> with your UvAnetID.

You can find the content, study load and other details of each of the course modules in the course descriptions in this guide.

You can find all regulations applying to the classes and examinations of the Master's programme in Ecology in the [Academic and Examination Regulations](#) of the Master's Programme Ecology at the FALW website.

The year schedule 2013 - 2014 can be found at the [FALW-website](#). Further information about the MSc programme [Ecology](#).

Note: Not every course is given each year, so please consult the year schedules for further information.

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Expired programme components Ecology

Courses:

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Spatial Analysis for Ecologists	Ac. Year (September)	6.0	AM_470513
Spatial Ecology and Global Change	Ac. Year (September)	6.0	AM_470502

MSc Ecology, spec. Ecology and Evolution

Courses:

Name	Period	Credits	Code
Current Trends in Evolution	Period 1	6.0	AM_1038-UvA
Environmental Genomics and Adaptation	Period 2	6.0	AM_470506
Ethics in Life Sciences	Period 3	3.0	AM_470707
Evolution of Species Interactions	Ac. Year (September)	6.0	AM_1017-UvA
Evolutionary Dynamics	Ac. Year (September)	6.0	AM_1019
Experimental Design and Analysis	Period 2	6.0	AM_470505
Literature Survey Ecology	Ac. Year (September)	12.0	AM_1101
Masterclasses in Ecology and Evolution	Ac. Year (September)	3.0	AM_1016
Microbial Ecology	Period 1	6.0	AM_470511
Research Project Ecology and Evolution 1	Ac. Year (September)	30.0	AM_1100
Research Project Ecology and Evolution II	Ac. Year (September)	30.0	AM_1114
Scientific Writing in English	Ac. Year (September)	3.0	AM_471023
Soil-Plant-Animal Interactions	Period 1	6.0	AM_470507
Spatial Processes in Ecology and Evolution	Period 1	6.0	AM_1039-UvA

MSc Ecology, spec. Environmental Chemistry and Toxicology

Courses:

Name	Period	Credits	Code
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(Bio)Molecular Spectroscopy	Period 5	6.0	X_435062
Aquatic Ecology	Period 1	6.0	AM_450137
Assessment of Natural and Chemical Hazards	Ac. Year (September), Period 4	6.0	AM_1042-UvA
Biogeochemical cycles	Period 4	6.0	AM_1043-UvA
Environmental Chemistry and Toxicology I	Period 1	6.0	AM_1032
Environmental Chemistry and Toxicology II	Period 1	6.0	AM_1033
Environmental Measuring Techniques	Ac. Year (September)	6.0	AM_1041-UvA
Ethics in Life Sciences	Period 3	3.0	AM_470707
Experimental Design and Analysis	Period 2	6.0	AM_470505
Literature Survey Ecology	Ac. Year (September)	12.0	AM_1101
Mass Spectrometry	Period 2	6.0	X_435604
Masterclasses in Ecology and Evolution	Ac. Year (September)	3.0	AM_1016
Research Project Environmental Chemistry and Toxicology I	Ac. Year (September)	30.0	AM_1108
Research Project Environmental Chemistry and Toxicology II	Ac. Year (September)	30.0	AM_1113
Scientific Writing in English	Ac. Year (September)	3.0	AM_471023
Separation Sciences	Period 1	6.0	X_435609
Spatial Processes in Ecology and Evolution	Period 1	6.0	AM_1039-UvA

(Bio)Molecular Spectroscopy

Vakcode	X_435062 (435062)
Periode	Periode 5
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. G.W. Somsen
Docent(en)	prof. dr. G.W. Somsen
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak

Acquiring a deeper knowledge of various frequently applied spectroscopic techniques in (bio)analytical chemistry, viz. UV/Vis, fluorescence, IR- and Raman spectroscopy. Becoming acquainted with other important techniques, such as atomic spectroscopy, surface techniques, phosphorescence, LC-NMR and circular dichroism.

Inhoud vak

The physico-chemical principles of the methods and the interactions between light and atoms/molecules will be discussed. The applicability of the techniques will be demonstrated and important instrumental developments, such as laser excitation and modern detection schemes will also be covered.

Onderwijsvorm

Lectures and tutorials.

Toetsvorm

Written examination.

Literatuur

Book chapters and recent summarizing articles will be provided by the lecturer.

Vereiste voorkennis

Knowledge of the basic principles of molecular orbitals, molecular vibrations, and of absorption, fluorescence, and infrared spectroscopy.

Doelgroep

mCh-AS

Aquatic Ecology

Vakcode	AM_450137 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	prof. dr. J.E. Vermaat
Lesmethode(n)	Werkcollege, Practicum
Niveau	400

Doel vak

1. Acquire an understanding of the complexity and biotic richness of aquatic ecosystems and the importance of the medium, water, in shaping this.
2. Acquire an understanding of the links between aquatic ecology and water quality, and develop the capacity to interpret patterns from the one into those of the other field
3. Be able to understand, summarise, and debate papers from the primary literature selected to deepen the subjects presented with help of the text book
4. Be able to design, carry out and report on a limited field study in the waters around Amsterdam and test a self-developed hypothesis

Inhoud vak

This is an introductory course to for earth scientists interested in water that want to enrich their expertise with ecology. It can also serve to add a view on aquatic habitats for ecologists that mainly have been exposed to terrestrial habitats so far. The subject is presented at a master's level with a focus on independent exploration in the field and primary literature. The course will be taught from a basic textbook,

Dobson & Frid (2009), as starting point, with excursions to papers providing depth to the chapters.

Characterisation of the content: Commonalities versus specific features of aquatic ecosystems: lakes, rivers, estuaries, the sea. Interactions between water body and surrounding land (catchment). A systems perspective: important processes and the role of biota: marginal or crucial? Interactions among biota in the food-web (predation, competition) and otherwise (the role of engineers or keystone species, mutuality, mutualism). Aquatic biodiversity: what does it mean? Biota as indicators of water and sediment quality in rivers and lakes. Aquatic ecology for water quality and quantity management.

Onderwijsvorm

1. plenary lectures (5 x 4 = 20 hrs). Lecture format: Vermaat discusses chapter content, students give a brief presentation on deepening papers. Non-presenting students are expected to have prepared by reading these chapters and the two accompanying, deepening papers (see below) before the lecture. The lecture is concluded with debate on the accompanying paper.
2. comparative fieldwork in small groups of 2-4 students: spatial gradients among and within water bodies around Amsterdam (field 2 d, lab processing 2 d), concluded by student seminars on fieldwork (4 hrs); student groups write a report on their fieldwork subject (length 5-10 pp, 11 pt Times New Roman, Introduction, Method, Results, Discussion, References containing ~ 10 papers from the primary literature)
3. literature study for deepening presentations and field work report.

Toetsvorm

Written exam (60%), fieldwork report (30%), oral presentations (both on book and lab work, content and quality, 10%). The written exam is open book.

Literatuur

Book: Dobson M & Frid C., 2009. Ecology of Aquatic Systems, 2nd edition. Oxford University Press, 321 pp; ISBN: 9 780199 297542
Selected deepening papers (liable to change, will be communicated at start of course):

Rivers

Poole GC, 2002. Fluvial landscape ecology: addressing uniqueness within the river discontinuum. *Freshwat Biol* 47, 641-660.
Lamouroux N, Poff NL, Angermeier PL, 2002. Intercontinental convergence of stream fish community traits along geomorphic and hydraulic gradients. *Ecology* 83, 1792-1807

Estuaries

Bishop MJ, Kelaher BP, Smith MPL, York PH, Booth DJ, 2006. Ratio-dependent response of a temperate Australian estuarine system to sustained nitrogen loading. *Oecologia* 149, 701-708.
Soetaert K, Middelburg JJ, Heip C, 2006. Long-term change in dissolved inorganic nutrients in the heterotrophic Scheldt estuary (Belgium, The Netherlands) *Limnol Oceanogr* 51, 409-423.

Coastal Seas

Bianchi TS, Westman P, Andren T, Rolff C, Elmgren R, 2000. Cyanobacterial blooms in the Baltic Sea: natural or human-induced? *Limnol Oceanogr* 45, 715-726.
McQuatters-Gollop A, Raitsos DE, Attrill M, Edwards M, Lavender S, Mee

L, 2007. A new long-term chlorophyll dataset reveals a regime shift in North Sea phytoplankton biomass unconnected to nutrient levels. *Limnol. Oceanogr.* 52, 635-648.

Open Ocean

Worm B, and many others, 2006. Impacts of biodiversity loss on ocean ecosystem services. *Science* 314, 787-790.

Beaugrand G, 2009 Decadal changes in climate and ecosystems in the North Atlantic Ocean and adjacent seas. *Deep Sea Res II* 56, 656-673.

Aanbevolen voorkennis

Basic statistics, introduction in hydrology

Doelgroep

MSc Earth Sciences (all tracks), MSc Hydrology, MSc Biology, MSc Ecology

Assessment of Natural and Chemical Hazards

Vakcode	AM_1042-UvA ()
Periode	Ac. Jaar (september), Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen

Inhoud vak

This course is offered by the UvA. See for the description

<http://studiegids.uva.nl/web/uva/sgs/nl/c/7775.html>

Overige informatie

Coordinator: Parsons (UvA).

The course description can be found on the UvA website:

http://studiegids.uva.nl/sgs/WebSite_nl.

Course registration via UvA, not VU.

Biogeochemical cycles

Vakcode	AM_1043-UvA ()
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen

Inhoud vak

This course is offered by the UvA. See for the description

<http://studiegids.uva.nl/web/uva/sgs/nl/c/10611.html>

Overige informatie

Coordinator: Kalbitz (UvA).

The course description can be found on the UvA website:

http://studiegids.uva.nl/sgs/WebSite_nl.

Course registration via UvA, not VU.

Current Trends in Evolution

Vakcode	AM_1038-UvA ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Niveau	500

Inhoud vak

This course is offered by the UvA. See for the course description:

<http://studiegids.uva.nl/web/uva/sgs/nl/c/741402.html>

Overige informatie

Coordinator: A. Groot (UvA).

The course description can be found on the UvA website:

http://studiegids.uva.nl/sgs/WebSite_nl.

Course registration via UvA, not VU.

Environmental Chemistry and Toxicology I

Vakcode	AM_1032 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	prof. dr. ir. J. Legler
Docent(en)	dr. ir. C.A.M. van Gestel, prof. dr. ir. J. Legler, dr. ir. T.H.M. Hamers, dr. D.T. Jager
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak

This course, which can be followed together with the course Environmental Chemistry and Toxicology II, will teach you to evaluate the exposure to and effects of chemicals in the environment.

Environmental Chemistry and Toxicology (ECT) integrates two disciplines: environmental chemistry and environmental toxicology. This ECT I course focuses on environmental toxicology, which deals with effects of chemicals in the environment on wildlife and human health, covering the realm of effects ranging from molecular and cellular to whole organism and ecosystem effects. Environmental toxicology in itself is a multidisciplinary field encompassing various aspects of biology, ecology and risk assessment. Environmental chemistry deals with the sources and fate of chemicals, as well as their environmental partitioning and transport, degradation and deposition, and is covered in the course ECT II (AM_1033).

General aim:

The main aim of the course Environmental Chemistry and Toxicology I is to understand the biological effects of chemicals in the environment on organisms, including humans.

Learning objectives

At the end of the course you will have learned

1. The main questions and key concepts in the field of environmental toxicology

2. To think critically in environmental quality and risk assessment issues
3. To present scientific results (both written and oral) and place them in the appropriate scientific context

Inhoud vak

Students will obtain a sound theoretical background in the major concepts in toxicology. Topics include chemical uptake and metabolism, biochemical and physiological effects, community and population effects. Major groups of toxicants that will be discussed include pesticides, persistent organic pollutants and endocrine disrupting chemicals, as well as mixture toxicity. Toxicity testing and dose-response modeling are covered. One important aspect of the course is the risk assessment of chemicals: when do we say that the exposure to a chemical is safe and when is it hazardous? Students will learn how to perform a risk assessment as it is done in the real world, taking into account the exposure, effects on humans and wildlife, and other mitigating factors.

Onderwijsvorm

This course contains a series of lectures, seminars and working classes. Students prepare a scientific report on the risk assessment of chemicals and present their results in a series of presentations.

Lectures: 44 hours

Working classes: 12 hours

Presentations: 12 hours

Toetsvorm

The course is completed with a written exam worth 50% of the final mark. The risk assessment report is worth 25% of the final mark. A series of 3 presentations and the participation of the students in the course make up the final 25% of the course. The student has passed if the final mark is equal to or higher than 5.5 in a range from 1-10. Each component of the course (exam, report and presentations) must achieve a 5.0 or higher to pass.

Literatuur

Walker et al, Principles of Ecotoxicology, 4th Edition, 2012, ISBN 978-1-4398-6266-7

Vereiste voorkennis

This course is open to all Master students with a BSc in Biology, Biomedical Sciences, Ecology or Chemistry. It is a compulsory course for MSc Ecology – ECT track students. For more information and to determine if you have sufficient background to take this course, please contact the coordinator (juliette.legler@vu.nl)

Doelgroep

This course is open to all Master students with a Biology, Ecology or Chemistry BSc. It is a compulsory course for MSc Ecology – ECT track students and can be followed in combination with ECT II (see AM_1033).

Environmental Chemistry and Toxicology II

Vakcode	AM_1033 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels

Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	prof. dr. ir. J. Legler
Docent(en)	prof. dr. ir. J. Legler, dr. ir. C.A.M. van Gestel, dr. ir. T.H.M. Hamers
Lesmethode(n)	Hoorcollege, Practicum
Niveau	400

Doel vak

This course in environmental chemistry has the main aim of understanding processes that chemicals undergo in the environment. The course is taught at the UvA. It can be followed together with the course Environmental Chemistry and Toxicology I, which focuses on environmental toxicology.

Inhoud vak

This course describes the behaviour and fate of natural and man-made chemicals in water, soil and air and the organisms present therein. Topics include transport and distribution processes, and physico/biochemical reactions of compounds in environment(al conditions); environmental soil chemistry; bioavailability, bioaccumulation, metabolism, and degradation of chemicals; biomonitoring, prediction and fate modelling in environmental compartments; biogeochemical cycles, structure property/activity relationships.

Onderwijsvorm

This course contains a series of lectures, seminars and working classes.
Lectures: 26 hours
Working classes: 4 hours

Toetsvorm

The final mark will be determined by a written exam

Literatuur

Schwarzenbach, Gswend, Imboden. 2003. Environmental Organic Chemistry, Wiley, New York ISBN 0-47135053-2 (hardcover)

Vereiste voorkennis

For more information and to determine if you have sufficient background to take this course, please contact the coordinator (email:pim.de.voogt@uva.nl)

Doelgroep

Bachelors preferably in Earth Sciences or Chemistry but also Biology or other Natural Sciences may be possible.

This course is open to all Master students with a Biology, Ecology or Chemistry BSc. It is a compulsory course for MSc Ecology – ECT track students and can be followed in combination with ECT I (see AM_1032).

Overige informatie

To take this course, students must register temporarily (bijvakstudent) at the UvA (see course description UvA-site).

External lecturers:

Dr. W.P. de Voogt (UvA)

Dr. J. Parsons (UvA)

prof.dr. R.W.P.M. Laane (Deltares)

Environmental Genomics and Adaptation

Vakcode	AM_470506 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. ir. T.F.M. Roelofs
Docent(en)	dr. H. Schat, dr. ir. T.F.M. Roelofs
Lesmethode(n)	Hoorcollege, Computerpracticum, Practicum
Niveau	500

Doel vak

Students will be able to:

Describe different molecular genetic techniques to study gene expression and genomic variation in response to environmental stimuli.

Explain how to use these techniques in ecological and physiological research.

Analyze experimental data generated by genomics research and knowing the possibilities for follow-up research.

Find and analyze genomic data in databases on internet.

Describe the functional significance of genomic variation for organisms and populations in natural environments.

Explain the evolutionary consequences of such variation for species abundance, community diversity, and the evolution of speciation.

Inhoud vak

Researchers in ecology and physiology are making extensive use of molecular techniques. Environmental genomics can be used to advance our understanding of how organisms make functional responses to changes within their local environment and its consequences for species abundance, community diversity, and the evolution of speciation. In this course we will focus on:

Regulated gene expression. Which genes are turned on in response to environmental change, 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?

Evolutionary consequences of genomic variation. What are the ecosystem-, community-, and population-level consequences of the molecular transformations performed by these genes?

Reference will be 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.

Onderwijsvorm

Lectures, a seminar discussing recent literature, practical training and self study.

Toetsvorm

Report and oral presentation of a research paper (30% of final grade).

Results of assignments (required online submission). Written exam (70% of final grade).

Literatuur

N. M. van Straalen and D. Roelofs 2006. An Introduction to Ecological Genomics. Oxford University Press.

Vereiste voorkennis

Evolutionary Genetics (AB_470053) or Molecular Developmental Biology (AB_470038)

Overige informatie

This course is not being offered during 2012 - 2013; next occasion will be 2013 - 2014

Environmental Measuring Techniques

Vakcode	AM_1041-UvA ()
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen

Inhoud vak

This course is offered by the UvA. See for the description:

<http://studiegids.uva.nl/web/uva/sgs/nl/c/7903.html>

Overige informatie

Coordinators: de Voogt / Kalbitz (UvA).

The course description can be found on the UvA website:

http://studiegids.uva.nl/sgs/WebSite_nl.

Course registration via UvA, not VU.

Ethics in Life Sciences

Vakcode	AM_470707 ()
Periode	Periode 3
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	prof. dr. J.T. de Cock Buning
Docent(en)	prof. dr. J.T. de Cock Buning, dr. J.F.H. Kupper
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Doel vak

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's own 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

Inhoud vak

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.

Onderwijsvorm

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.

Toetsvorm

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

Literatuur

Available on Blackboard

Vereiste voorkennis

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

Doelgroep

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

Overige informatie

Lectures in English, part of the workgroups are in Dutch. All presentations and plenary discussions in English. Attendance is compulsory.

Evolution of Species Interactions

Vakcode	AM_1017-UvA ()
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels

Faculteit	Fac. der Aard- en Levenswetenschappen
Niveau	500

Doel vak

Objectives of the course Evolution of Species Interaction: To analyse phylogenetic patterns of interacting species (endosymbiont-host, plant-pollinator, and insect herbivore-plant associations); to analyse the major traits that maintain these interactions and how these traits evolve; to formulate hypotheses how species interactions evolve and how this might lead to new species. The course focusses on chemical signals in intra- and interspecific communication (chemical ecology).

Inhoud vak

Topics include advanced phylogenetic techniques, phylo-/bio-geography, analysis of (in)congruence between phylogenetic trees of interacting groups of species, character trait evolution, intra- (sex pheromones) and interspecific (secondary plant compounds) chemical communication, evolution of signalling systems (receptor proteins), phylogenetic conservatism in host use, evolution of specialisation (evolutionary dead-end), and sexual selection and speciation models. Relevant techniques will be demonstrated or practiced in small experiments [e.g., behavioural assays, gas-chromatography (GC), mass spectrometry, electrophysiology (both olfaction and taste recording from insect sensory organs) and coupled GC-electrophysiology to aid the identification of biologically active compounds].

Onderwijsvorm

Discussion of literature & poster (1,5 EC), lectures (3 EC) and practicals/demonstrations (1.5 EC)

Toetsvorm

Written examination (essay) 70%, practicals 20% and attitude 10%

Literatuur

Recommended: Schoonhoven et al (2005). Insect-plant biology, Oxford University Press, Oxford, ISBN 0-19-852958-8

Referencebook: Futuyama, D.J. (2005) Evolution, Sinauer, Sunderland, ISBN 0-087893-187-2

Reader (ca. 10 euro)

Vereiste voorkennis

Bachelor Biology

Overige informatie

Co-ordinator: dr. P. Roessingh
Science Park 904 kamer C2.209
+31 20 5257732

Lecturers: prof. dr. S.B.J. Menken, dr Toby Kiers (VU) and dr. P. Roessingh.

Registration via studieweb (UvA, at least 4 weeks before the start of the semester) and VUnet (VU, at least 4 weeks before the start of the period).

The course schedule will be published on Blackboard and on the website www.student.uva.nl (choose the specific master).

Minimum 4, maximum 24 students.

A supplementary programme for foreign students is available (mandatory for major projects).

Location: Science Park Amsterdam.

Evolutionary Dynamics

Vakcode	AM_1019 ()
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. G.J.J. Driessen
Niveau	500

Inhoud vak

This course is delivered at the UvA. For more information see this link.

<http://studiegids.uva.nl/web/uva/sgs/en/c/14382.html>

Experimental Design and Analysis

Vakcode	AM_470505 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. ir. P.M. van Bodegom
Docent(en)	dr. ir. P.M. van Bodegom, dr. G.J.J. Driessen, J. Duivenvoorden, dr. P.H. Vos
Lesmethode(n)	Hoorcollege, Computerpracticum
Niveau	500

Doel vak

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

Inhoud vak

A proper experimental design combined to a suitable statistical analysis is essential to -ecological- 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 these techniques independently. The application -and not the mathematics- of the techniques 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 PCA, similarity analysis and meta analysis are dealt with. Other biological questions like classification issues, working with large datasets, data reduction and multiple response variables are discussed.

Onderwijsvorm

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 .

Toetsvorm

Report on the final case study (100%)

Literatuur

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.

Vereiste voorkennis

Methodology and statistics 1 and 2 or equivalent statistics courses (contact lecturer in the latter case)

Doelgroep

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.

Overige informatie

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

Literature Survey Ecology

Vakcode	AM_1101 ()
Periode	Ac. Jaar (september)
Credits	12.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. G.J.J. Driessen
Niveau	600

Doel vak

For master students in Ecology and Evolution it is required to carry out a thesis based on a literature survey (12 ec). The literature survey can focus on a fundamental ecological question but may also take a more applied approach. The aim is to demonstrate the ability to efficiently process material in a given field and evaluating this critically. The topic and research question are free of choice.

Inhoud vak

Every literature survey has to be approved by the master coordinator in advance (on behalf of the examination board). Therefore you should hand in a proposal that you have discussed with the faculty staff member or external supervisor. The project proposal includes the following topics:

- 1) A short description of the research theme and the scientific and societal (if applicable) relevance of your work.
- 2) From this you develop one or more clearly formulated and structured research questions. This is an important point: loosely formulated research questions always produce bad science.
- 3) The search engine(s) and keywords that you think you will use and a basic design of your thesis.
- 4) Name(s) of the supervisor(s), and in case you do a survey under supervision outside our own institute you also give their background and the address/e-mail of their institute.
- 5) A time schedule.

Prior to participating in any thesis or literature survey, both student and faculty staff member and/or external supervisor involved should fill out a written application and agreement form. This form (for thesis and literature surveys) and the general regulations for internships and literature study can be downloaded from:

<http://www.falw.vu.nl/en/students/regulations/internship-literature-study-regulations/>

Use the form for the Health and Life Sciences. The form concerns details on supervision, amount of time to be invested, allotted study credits, safety regulations, etc. At the end of the literature survey the student gives a presentation of the work in the Department of Ecology.

Toetsvorm

There is a special assessment form (attached to the application form) that has to be filled out by the first and second lecturer/supervisor.

Literature theses will be assessed according to the following categories:

- A. Execution (25%)
- B. Thesis (50%)
- C. Oral Presentation (25%)

The forms have to be handed to the co-ordinator of the master programme and the student secretary. The master co-ordinator approves or rejects the projects on behalf of the examination board.

In order to have the mark registered, the student should hand in an electronic copy of the thesis, the signed assessment form and an evaluation form at the FALW programme secretariat.

Overige informatie

Language of tuition: Dutch

Mass Spectrometry

Vakcode	X_435604 (435604)
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

<http://studiegids.uva.nl/xmlpages/page/2014-2015/zoek-vak/vak/229>

Toetsvorm

Written examination.

Vereiste voorkennis

Basic knowledge of mass spectrometry, organic chemistry and biochemistry.

Doelgroep

mCh-AS, mDDS-BCCA, mDDS-DDTF, mDDS-C-var, mDDS-E-var, mDDS-M-var

Overige informatie

Registration via <https://www.sis.uva.nl> is mandatory 4 weeks before the start of the Semester.

Masterclasses in Ecology and Evolution

Vakcode	AM_1016 ()
Periode	Ac. Jaar (september)
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	prof. dr. J. Ellers
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	400

Doel vak

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

Inhoud vak

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.

Onderwijsvorm

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.

Toetsvorm

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.

Literatuur

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

Vereiste voorkennis

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.

Doelgroep

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. This course is also open to PhD students from the SENSE research school.

Overige informatie

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

Microbial Ecology

Vakcode	AM_470511 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	prof. dr. G.A. Kowalchuck
Docent(en)	prof. dr. G.A. Kowalchuck
Lesmethode(n)	Hoorcollege, Computerpracticum, Practicum

Inhoud vak

This course is delivered at the UvA. For more information follow this link:

<http://studiegids.uva.nl/web/uva/sgs/en/c/14424.html>

Research Project Ecology and Evolution 1

Vakcode	AM_1100 ()
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. G.J.J. Driessen
Niveau	600

Doel vak

The aims of the master's placement 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 a scientific report.
- The student is able to cooperate with researchers of various disciplines.
- The student is able to write a scientific report of the research on the level of peer-reviewed academic journals.
- 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.

Inhoud vak

The two research projects in the Ecology programme serve to get students acquainted and experienced with the practice of ecological research. Both research projects should thus reside in Ecology. If you have 12 ec in elective courses in your programme both research projects together will have to amount up to 75 ec. If you have 18 ec in elective courses the total study load is 69 ec. The shortest project should at least be 30 ec.

The first research project during your MSc Ecology must take place at the Department of Ecological Science at the VU, or at the Institute for Biodiversity and Ecosystem Dynamics at the UvA.

For research projects at the Ecology department of the VU 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 Waterschap). However, organisations for the conservation of specific species (f.e. butterflies, dolphins, tigers, primates, etc.) will generally not be qualified enough. Research projects/internships in commercial companies are generally also not accepted, since commercial and educational interests often are quite different. Projects at universities or research institutes outside the Netherlands can also be accepted provided they are of sufficient academic quality.

In all cases: take care that you will be working on an ecological research question 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 allowed.

Onderwijsvorm

A Placement Manual for Research Projects in the MSc Ecology can be obtained from the master coordinator (g.j.j.driessen@vu.nl). This document contains the protocols, guidelines for proposals and reports and application and assessment forms, etc. needed to successfully complete a research project. It is very important to read this document carefully in order to avoid unpleasant experiences during the progress of the placement. Every research project or literature study has to be approved by the master coordinator in advance.

Toetsvorm

At the end of the project a scientific report of the work has to be written in English an oral presentation has to be given also in English. The final grade will be based on the following categories: attitude (pass/fail), execution (20%), presentation (20%) and report (60%).

Vereiste voorkennis

You are not allowed to start a research project before having obtained already 18 ec in master courses.

Aanbevolen voorkennis

The MSc course Experimental Design and Analysis (AM_470505) is strongly recommended.

Overige informatie

The Research project year II has no official course code yet, since it will only take place as from 2013 - 2014. Still this is the description:

Course objective

The research projects serve to get students acquainted and experienced with the practice of ecological research. Both research projects should thus reside in Ecology. At the end of the project a scientific report of the work has to be written in English an oral presentation has to be given also in English. If you have 12 ec elective courses in your programme both research projects together will have to amount up to 75 ec. If you have 18 ec elective courses the total study load is 69 ec. The shortest project should at least be 30 ec.

Course content

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), ALTEERRA (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 Waterschap). However, organisations for the conservation of specific species (f.e. butterflies, dolphins, tigers, primates, etc.) will generally not be qualified enough. Research projects/internships in commercial companies are generally also not accepted, since commercial and educational interests often are quite different. Projects at universities or research institutes outside the Netherlands are also accepted provided they are of sufficient academic quality. In all cases: take care that you will be working on an ecological research question 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 allowed.

Form of tuition

Every research project (and literature survey) has to be approved by the master coordinator in advance (on behalf of the examination board). Therefore you should hand in a project proposal that you have discussed with the faculty staff member or external supervisor. The project proposal includes the following topics:

- 1) A short description of the research theme and the scientific and societal relevance of your work.
- 2) From this you develop one or more clearly formulated and structured research questions. This is an important point: loosely formulated research questions always produce bad science.
- 3) An explanation of the design of your research. What are you going to do to get an answer to your research question? Here you might also indicate which statistical methods you are going to apply.
- 4) An expectation of how the results would look like under your hypothesis.
- 5) Name(s) of the supervisor(s), and in case you do a project outside our own institute you also give their background and the address/e-mail of their institute.

6) A time plan and in case of field work or work abroad a description of the research facilities.

7) A safety analysis if you plan to go to a non-western country.

Prior to participating in any thesis or literature survey, both student and faculty staff member and/or external supervisor involved should also fill out a written application and agreement form. This form (for thesis and literature surveys) and the general regulations for internships and literature study can be downloaded from

www.falw.vu.nl/en/students/regulations/internship-literature-study-regulations.

Use the form for the Health and Life Sciences. The form concerns details on supervision, amount of time to be invested, allotted study credits, safety regulations, etc. At the end of the project the student gives a presentation of the work in the Department of Ecology.

Type of assessment

There is a special assessment form (attached to the application form) that has to be filled out by the first and second lecturer. Projects and literature theses will be assessed according to the following categories:

- A. Practical Execution and Attitude (25%)
- B. Professional Development (10%)
- C. Scientific Execution and Content of the Report (50%)
- D. Layout and Form of the Report (5%)
- E. Oral Presentation (10%)

The forms have to be handed to the co-ordinator of the master programme and the student secretary. The master co-ordinator approves or rejects the projects on behalf of the Examination board.

In order to have the mark registered, the student should hand in an electronic copy of the thesis (via Blackboard), the signed assessment form and an evaluation form to the programme secretariat.

Research Project Ecology and Evolution II

Vakcode	AM_1114 ()
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. G.J.J. Driessen
Niveau	600

Research Project Environmental Chemistry and Toxicology I

Vakcode	AM_1108 ()
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	prof. dr. ir. J. Legler
Niveau	600

Doel vak

The aims of the master's placement 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 a scientific report.
- The student is able to cooperate with researchers of various disciplines.
- The student is able to write a scientific report of the research on the level of peer-reviewed academic journals.
- 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.

Inhoud vak

The two research projects in the MSc Environmental Chemistry and Toxicology specialization serve to get students acquainted and experienced with the practice of research in environmental chemistry and environmental toxicology. Students are required to do one research project in environmental chemistry (AM_1108), and one in environmental toxicology (AM_1113). Each research projects is 30 Ec. One of the projects may be extended by 6 Ec by substituting an elective course. The first research project during your MSc Ecology – ECT must take place at the Institute for Environmental Studies or Department of Ecological Sciences at the VU, or at the Institute for Biodiversity and Ecosystem Dynamics at the UvA.

For research projects at the VU, contact the coordinator or check the website:

www.falw.vu.nl/nl/onderzoek/ecological-sciences/internships-at-the-institute.

If you would like to do a project outside the VU you may look for internships at the websites of other Dutch universities or research institutes, for example: KWR or Waternet (applied water research), NIOO (fundamental ecological research), NIOZ (marine ecology), IMARES (fisheries and sea research), ALTERRA (applied and environmental ecology), RIVM (applied and environmental ecology), Deltares (applied environmental sciences), but also at the sites of nature conservation organisations such as Natuurmonumenten, Staatsbosbeheer, or regional authorities (Provincie and Waterschap). Projects at universities or research institutes outside the Netherlands can also be accepted provided they are of sufficient academic quality.

In all cases: take care that you will be working on either an environmental chemistry or environmental toxicology research question 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 allowed.

Onderwijsvorm

A Placement Manual for Research Projects in the MSc Ecology can be obtained from the master coordinator (g.j.j.driessen@vu.nl). This

document contains the protocols, guidelines for proposals and reports and application and assessment forms, etc. needed to successfully complete a research project. It is very important to read this document carefully in order to avoid unpleasant experiences during the progress of the placement. Every research project or literature study has to be approved by the master coordinator in advance.

Toetsvorm

At the end of the project a scientific report of the work has to be written in English an oral presentation has to be given also in English. The final grade will be based on the following categories: attitude (pass/fail), execution (20%), presentation (20%) and report (60%).

Vereiste voorkennis

You are not allowed to start a research project before having obtained already 18 ec in master courses.

Aanbevolen voorkennis

The MSc course Experimental Design and Analysis (AM_470505) is strongly recommended.

Doelgroep

MSc Ecology - ECT students

Overige informatie

For more information, please contact: Prof. dr. ir J. Legler, Room A-562, 020-5989516, juliette.legler@vu.nl

Research Project Environmental Chemistry and Toxicology II

Vakcode	AM_1113 ()
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	prof. dr. ir. J. Legler
Niveau	600

Doel vak

The aims of the master's placement 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 a scientific report.
- The student is able to cooperate with researchers of various disciplines.
- The student is able to write a scientific report of the research on the level of peer-reviewed academic journals.
- 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.

Inhoud vak

The two research projects in the MSc Environmental Chemistry and Toxicology specialization serve to get students acquainted and experienced with the practice of research in environmental chemistry and environmental toxicology. Students are required to do one research project in environmental chemistry (AM_1108), and one in environmental toxicology (AM_1113). Each research project is 30 Ec. One of the projects may be extended by 6 Ec by substituting an elective course. The first research project during your MSc Ecology – ECT must take place at the Institute for Environmental Studies or Department of Ecological Sciences at the VU, or at the Institute for Biodiversity and Ecosystem Dynamics at the UvA.

For research projects at the VU, contact the coordinator or check the website:

www.falw.vu.nl/nl/onderzoek/ecological-sciences/internships-at-the-institute.

If you would like to do a project outside the VU you may look for internships at the websites of other Dutch universities or research institutes, for example: KWR or Waternet (applied water research), NIOO (fundamental ecological research), NIOZ (marine ecology), IMARES (fisheries and sea research), ALTERRA (applied and environmental ecology), RIVM (applied and environmental ecology), Deltares (applied environmental sciences), but also at the sites of nature conservation organisations such as Natuurmonumenten, Staatsbosbeheer, or regional authorities (Provincie and Waterschap). Projects at universities or research institutes outside the Netherlands can also be accepted provided they are of sufficient academic quality.

In all cases: take care that you will be working on either an environmental chemistry or environmental toxicology research question 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 allowed.

Onderwijsvorm

A Placement Manual for Research Projects in the MSc Ecology can be obtained from the master coordinator (g.j.j.driessen@vu.nl). This document contains the protocols, guidelines for proposals and reports and application and assessment forms, etc. needed to successfully complete a research project. It is very important to read this document carefully in order to avoid unpleasant experiences during the progress of the placement. Every research project or literature study has to be approved by the master coordinator in advance.

Toetsvorm

At the end of the project a scientific report of the work has to be written in English an oral presentation has to be given also in English. The final grade will be based on the following categories: attitude (pass/fail), execution (20%), presentation (20%) and report (60%).

Vereiste voorkennis

You are not allowed to start a research project before having obtained already 18 ec in master courses.

Aanbevolen voorkennis

The MSc course Experimental Design and Analysis (AM_470505) is strongly recommended.

Doelgroep

MSc Ecology - ECT students

Overige informatie

For more information, please contact: Prof. dr. ir J. Legler, Room A-562, 020-5989516, juliette.legler@vu.nl

Scientific Writing in English

Vakcode	AM_471023 ()
Periode	Ac. Jaar (september)
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	M. van den Hoorn
Lesmethode(n)	Werkgroep
Niveau	400

Doel vak

The aim of this course is to provide Master's students with the essential linguistic know-how for writing a scientific article in English that is well organized idiomatically and stylistically appropriate and grammatically correct.

At the end of the course students

- know how to structure a scientific article;
- know what the information elements are in parts of their scientific article;
- know how to produce clear and well-structured texts on complex subjects;
- know how to cite sources effectively;
- know how to write well-structured and coherent paragraphs;
- know how to construct effective sentences;
- know what collocations are and how to use them appropriately;
- know how to adopt the right style (formal style, cohesive style, conciseness, hedging)
- know how to avoid the pitfalls of English grammar;
- know how to use punctuation marks correctly;
- know what their own strengths and weaknesses are in writing;
- know how to give effective peer feedback.

Final texts may contain occasional spelling, grammatical or word choice errors, but these will not distract from the general effectiveness of the text.

Inhoud vak

The course will start with a general introduction to scientific writing in English. Taking a top-down approach, we will then analyse the structure of a scientific article in more detail. As we examine each section of an article, we will peel back the layers and discover how paragraphs are structured, what tools are available to ensure coherence within and among paragraphs, how to write effective and grammatically correct sentences and how to choose words carefully and use them effectively.

Topics addressed during the course include the following:

- Structuring a scientific article
- Considering reading strategies: who is your readership? How do they read your text? What do they expect? How does that affect your writing?
- Writing well-structured and coherent paragraphs
- Composing effective sentences (sophisticated word order, information distribution).
- Arguing convincingly – avoiding logical fallacies
- Academic tone and style: hedging – why, how, where?
- Using the passive effectively
- Understanding grammar (tenses, word order, etc.)
- Understanding punctuation
- Referring to sources: summarising, paraphrasing, quoting (how and when?)
- Avoiding plagiarism
- Vocabulary development: using appropriate vocabulary and collocations

Onderwijsvorm

Scientific Writing in English is an eight-week course and consists of 4 contact hours during the first week and 2 contact hours a week for the rest of the course. Students are required to spend at least 6 to 8 hours of homework per week. They will work through a phased series of exercises that conclude with the requirement to write several text parts (Introduction, Methods or Results section, Discussion and Abstract). Feedback on the writing assignments is given by the course teacher and by peers.

Toetsvorm

Students will receive the three course credits when they meet the following requirements:

- Students hand in three writing assignments (Introduction, Methods or Results, Discussion) and get a pass mark for all writing assignments;
- Students provide elaborate peer feedback;
- Students attend all sessions;
- Students are well prepared for each session (i.e. do all homework assignments);
- Students actively participate in class;
- Students do not plagiarise or self-plagiarise.

Literatuur

Effective Scientific Writing: An Advanced Learner's guide to Better English (A. Bolt & W. Bruins, ISBN 978 90 8659 6171). VU bookstore: €27.95.

Doelgroep

This course is only open to students of the Master's programmes of the Faculty of Earth and Life Sciences mentioned below. These students are only eligible to the course if they have already conducted scientific research (e.g. for their Bachelor's thesis) or if they will be working on a research project when taking Scientific Writing in English.

Faculty of Earth and Life Sciences - Master's programmes:

- Biology;
- Health Sciences;
- Ecology;
- Biomolecular Sciences;

- Biomedical Sciences;
- Neurosciences;
- Global Health;
- Management, Policy Analysis and Entrepreneurship in Health and Life Sciences.

Overige informatie

- To do well, students are expected to attend all lessons. Group schedules are to be found at rooster.vu.nl and on Blackboard.
- A VUnet registration for this course is necessary in order to enroll or be enrolled in a Blackboard group. The VUnet registration automatically gives access to the corresponding Blackboard site.
- Group enrollment only takes place via Blackboard. For open/general groups: students have to enroll themselves following FALW programmes containing this course. For group assigned to specific studies, students are enrolled by the course coordinator).
- Make sure Scientific Writing in English does not overlap with another course.
- If you have registered for a group in Blackboard, you are expected to attend all sessions (eight). If you decide to withdraw from the course, do so in time, both on Blackboard and in VUnet. This all will avoid a 'fail' on your grade list for not taking part in this course and allows other students to fill in a possible very wanted group spot.
- If you (expect to) miss a session, please inform the group trainer as soon as possible. If you miss a session without notification, you may not be able to finish the course.
- For any questions concerning this course, please contact the course coordinator Marieke Zantkuijl: m.c.l.zantkuijl@vu.nl

Separation Sciences

Vakcode	X_435609 (435609)
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H. Lingeman
Docent(en)	dr. H. Lingeman
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak

Getting acquainted with the theory and practice of the main techniques in modern analytical separation science.

Inhoud vak

The topics discussed comprise the fundamentals, theory and practice of gas chromatography, the various modes of liquid chromatography, capillary-based electrophoretic approaches as well as the hyphenation of the various separation systems with mass spectrometry and other sensitive and selective detection devices.

Onderwijsvorm

Lectures and tutorials. Students have to summarize and present an (assigned) recent article on separation science.

Toetsvorm

Written examination and a mark for the article presentation.

Literatuur

Hands-outs (electronically available).

Vereiste voorkennis

Basic knowledge of biochemistry, chromatography, electrophoresis and mass spectrometry.

Aanbevolen voorkennis

Basic knowledge of biochemistry, chromatography, electrophoresis and mass spectrometry.

Doelgroep

mCh-AS

Soil-Plant-Animal Interactions

Vakcode	AM_470507 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	prof. dr. M.P. Berg
Docent(en)	prof. dr. M.A.P.A. Aerts, ing. R.S.P. van Logtestijn, prof. dr. J.H.C. Cornelissen, prof. dr. H.A. Verhoef, prof. dr. M.P. Berg
Lesmethode(n)	Hoorcollege, Practicum, Werkgroep, Excursie
Niveau	500

Doel vak

Students will be able to:

Underpin the importance of ecological interactions between the soil-subsystem and the plant-subsystem

Critically evaluate and investigate the relevant interactions between soil-soil organisms, soil-vegetation, and soil organisms-vegetation

Critically evaluate and investigate the relevant functional traits that underlie ecological interactions between the soil-subsystem and plant-subsystem

In the field: apply different techniques to survey the soil-subsystem and plant-subsystem, and to sample soil and soil organisms in the field

In the laboratory: investigate soil organisms and carry out ecological and biochemical analyses relevant to plant-soil interactions.

Inhoud vak

A hot theoretical topic in Ecology concerns the interdependency of belowground (green web) and aboveground compartments (brown web). This comprises key conceptual issues relating to interactions between above- and belowground communities, the importance of functional traits to

understand these interactions in the community, 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.

In this course we will focus theoretically on the following subjects:

The brown food web: biotic interactions and regulators
 Plant species and plant trait control of soil biota and processes
 Belowground consequences of green food web interactions
 Completing the circle: how soil food 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 Abisko, N-Sweden) where soil-plant interactions in subarctic ecosystems are currently being studied, with emphasis on (a) design and statistical treatment of soil-plant experiments, (b) techniques to identify soil organisms and analyses soil processes, biochemistry and vegetation development.

Toetsvorm

A seminar about one of the papers/chapters in the reader (25%), individual performance in critical group discussions about important theory based on these papers/chapters (25%), a final presentation (50%) about background, design and results of own research project.

Literatuur

Reader with selected literature, which includes recent key papers in international journals and extracts from David A. Wardle (2002): "Communities and Ecosystems": linking the aboveground and belowground component (Monographs in Population Biology nr 34). Princeton University Press.

Vereiste voorkennis

Community Ecology, Systems Ecology.

To attend this course there will be costs involved. To cover the expenses for the reader, travel to Swedish Lapland and accommodation a substantial fee is asked from MSc students.

Doelgroep

MSc students with focus on ecology.

Spatial Analysis for Ecologists

Vakcode	AM_470513 ()
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. ir. C.J.E. Schulp

Docent(en)	ir. A.Q.A. Omtzigt, dr. M.A. Eleveld, drs. A.J. Wagtendonk, drs. F.A. Hellmann
Lesmethode(n)	Hoorcollege, Computerpracticum
Niveau	400

Doel vak

Students will be able to:

Understand the capabilities and limitations of Geographical Information Systems (GIS) for ecologists;

Design and set up a spatial analyses for an ecological research question;

Acquire spatial data using Global Positioning System (GPS), Remote Sensing images, and other methods;

Evaluate the quality of spatial data, and thus the result of the analyses;

Apply spatial analyse techniques using a Geographical Information System (GIS);

Visualise research results in meaningful maps.

Inhoud vak

Spatial Analysis for Ecologists is a course for students who want to explore the spatial component of ecology. Spatial analyses techniques are used e.g. for monitoring of natural areas, environmental assessment studies and in scientific research of spatial phenomena. Examples of spatial phenomena are connectivity of ecological networks, spatial distribution of plant and animal species and bird migration.

These spatial phenomena can have different spatial scales: local, regional, national, international and global. An example of local phenomena is patchiness of the vegetation. Local variables that influence this phenomenon can be seed dispersal, slope, soil parameters and plant species etc. Processes on the lowest level are also influenced by processes on a higher spatial scale. The patchiness of the vegetation on the local scale will, in process of time, be influenced for example by climate change.

This course wants to provide a thorough theoretical background and a fundamental set of software skills. The software used during the course is ArcGIS. Topics covered in the course are:

- What is GIS
- Spatial Data types
- Spatial Data quality
- Remote Sensing Techniques
- Visualisation
- Set up of a spatial analyses
- Spatial modelling in ecology
- Spatial statistics
- Mobile GIS (with GPS) for field work

The applications of spatial analyses in ecology are diverse. Examples of the different types of spatial analyses, spatial modelling and spatial statistics in the literature and lectures will illustrate this.

The second part of the course is a case study, where the theory and skills acquired in the first part of the course will be applied on an existing spatial phenomenon. Students will work mainly independent, alone or in pairs, to analyse this spatial phenomena using ArcGIS software. VU Students can get their own copy of the GIS software for installation and use at their own PC or laptop at home.

Toetsvorm

Examination on theory; report on case study

Literatuur

Paul Bolstad (2008): "GIS Fundamentals", 3rd Edition,
ISBN: 978-0-9717647-2-9, Atlas Books

Vereiste voorkennis

Only open to second-year students MSc Biology (spec. Ecology) and MSc Ecology

Overige informatie

Minimum amount of registrations for the course to take place: 10.
2012 - 2013 is the last year of offering.

Spatial Ecology and Global Change

Vakcode	AM_470502 ()
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	prof. dr. J. Rozema
Lesmethode(n)	Hoorcollege, Excursie

Doel vak

The main aim of the course is the analysis of spatial and temporal distribution of organisms in the context of global climate change. In fact this refers to the field of biogeography.

In this course, MSc students will learn about the different vegetation zones of the earth, climate zones and climate change, biodiversity, disturbance history, ecosystem dynamics, patterns of distribution, and patterns of fauna and flora in the past and future. Special attention will be given to the range dynamics of species, that is, analysis of the factors that cause the range of a species to expand or diminish, depending on locally varying environmental factors. This course will emphasize an evolutionary and ecological approach, providing a causal explanation of the (changes) in the distribution of organisms. At the end of this course, students will have a deeper understanding of the patterns of distribution of living organisms across the earth's surface, and the underlying mechanisms.

Inhoud vak

Analysis and explanation of spatial and temporal distribution patterns comes from various scientific fields: ecology, evolution biology, phylogeny, paleontology, geology, geography, and climatology. Questions will be addressed such as why and how plant and animal species have become extinct, discussing natural and man-made causes. This is essential to understand past and present biodiversity on earth and how to preserve biodiversity. Various examples of how distributional changes relate to past and recent factors and processes will be treated. Glaciations and de-glaciations and the positioning of mountain ranges have differentially affected biodiversity of the North American and Eurasian Continent. Current global change, such as global warming and sea level rise leads to similar changes in distribution patterns of plants and animals and further insight and evidence for this

comes from past climate change. This course on spatial ecology and global change ecology will cover the following topics:

- Introduction to biogeography
- A history of biogeography
- Patterns of Distribution
- Patterns of Climate
- Living in the past
- Early life and moving continents
- Rise of the flowering plants
- Cretaceous and Cenozoic climate, geographic animal and floral changes
- Geography of life today
- Ice and Change
- Molecular and isotopic biogeography
- Methods of biogeographical analysis
- Paleogeography

The course will be given during 4 weeks, covering the afternoon of the first three weeks.

A first series of sessions will deal with dynamics of distribution areas and modeling; a second part consists of treatment of cases of spatial ecology of insects and invertebrate animals and the third part deals with case studies on plants and current and historic plant distributions.

Onderwijsvorm

The textbook mentioned will be used and the teachers of this course will treat parts of this textbook. General and modeling aspects of spatial and temporal distributions of organisms will be discussed, N. M van Straalen will address patterns of distribution of animals in an evolutionary context. J. Rozema will treat the distribution of plants with particular reference to the impact of global change. Evidence of how climate change has affected plant distribution on earth will be derived from the fossil pollen record. An excursion will be made to the Naturalis Museum, Leiden, to view and study various plant and animal groups representing relevant evolutionary and present-day developments.

Relevant recent literature on this aspect will be studied and discussed. Discussion sessions will be held on each aspect. Students are asked to write an essay on one of the aspects, to prepare an oral presentation and a written examination will complete the course.

The lecturers will introduce the basic ideas and subject matter of tuition and highlight some features of the aspect to be dealt with. The students are expected to write an essay based on topics explored by self study (a. o. search for literature) and prepare an oral presentation of the content of a journal paper or book chapter, which will be discussed.

Toetsvorm

Judgement and examination will be based on the essay completed, and the oral presentation (33. 3%) of the content of a journal paper or book chapter, a practical assignment (16. 7%) and a written examination (50%) on the subject matter of tuition.

Literatuur

The textbook "Biogeography, An Ecological and Evolutionary approach" by C.B. Cox, P.D. Moore. 2005. Blackwell Publishing. 7th edition. pp. 428 (Euro 32. 95) and additional selected articles (distributed beforehand).

Doelgroep

This course is obligatory for all students following the program of MSc Ecology. It will provide a basic training for various follow-up courses of choice.

Overige informatie

Please note: will not be offered in 2012 – 2013; possibly replaced per 2013 – 2014.

Spatial Processes in Ecology and Evolution

Vakcode	AM_1039-UvA ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Niveau	500

Inhoud vak

This course is offered by the UvA. See for the course description:

<http://studiegids.uva.nl/web/uva/sgs/nl/c/8773.html>

Overige informatie

Coordinator: M. Boerlijst (UvA).

The course description can be found on the UvA website:

http://studiegids.uva.nl/sgs/WebSite_nl.

Course registration via UvA, not VU.