



Environment and Resource Management MSc

Vrije Universiteit Amsterdam - Fac. der Aard- en Levenswetenschappen - M Environment and Resource Management
- 2013-2014

The one-year Master programme Environment and Resource Management (ERM) aims to ensure that students acquire theoretical concepts, practical skills and operational techniques that allow them to find solutions for societal problems that relate to natural resources and the environment. Students are trained to bring in their disciplinary knowledge and co-operate in multidisciplinary teams so that they can contribute to an integrated approach towards problem analysis and problem solving in private, public, national, and international organisations dealing with natural resources and the environment.

The programme offers four specializations:

- Environmental studies
- Energy studies
- Climate and Water
- Ecosystems Services and Biodiversity

The year schedule 2013 - 2014 can be found at the [FALW-website](#) .

Further programme information can be found at www.environmentmaster.nl.

A complete programme description can be found at the [FALW-website](#) .

New course on international development issues in the context of sustainable development available at the VU!

This innovative elective course is administered cooperatively by the Society for International Development (SID) and the Institute for Environmental Studies (IVM), and is open to all Master students from Dutch and European universities.

For more information click [here](#).

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Expired programme components ERM

Courses:

Name	Period	Credits	Code
Sustainability and Growth	Period 1	6.0	AM_468011
Workshop Governance for Sustainable Development		7.0	AM_468026

MSc ERM, spec. Climate and Water

Vakken:

Naam	Periode	Credits	Code
Climate and Policy	Periode 3	6.0	AM_450188
Water and Policy	Periode 1	6.0	AM_468023

MSc ERM, spec. Ecosystems Services

Vakken:

Naam	Periode	Credits	Code
Governance of Ecosystem Services	Periode 3	6.0	AM_468025
Value of Ecosystem Services	Periode 1	6.0	AM_468024

MSc ERM, spec. Energy Studies

Vakken:

Naam	Periode	Credits	Code
Energy System Transitions	Periode 3	6.0	AM_468019
Sustainable Energy Analysis	Periode 1	6.0	AM_468018

MSc ERM, spec. Environmental Studies

Opleidingsdelen:

- [optional modules](#)

- choose at least one of these courses

optional modules

Vakken:

Naam	Periode	Credits	Code
Aquatic Ecology	Periode 1	6.0	AM_450137
Climate Modelling	Periode 3	6.0	AM_450004
Modern Climate Systems	Periode 1	3.0	AM_450185
Modern Geo-ecosystems	Periode 1	3.0	AM_450313
Philosophy of Political Science and Research Methods		5.0	SPPSRM_O
Political Concepts and Processes		5.0	SPCP_O
Sedimentary Environments and Climate Archives	Periode 1	6.0	AM_450330
Theories and Approaches in International Relations		5.0	S-TAIR_O

choose at least one of these courses

Vakken:

Naam	Periode	Credits	Code
Climate and Policy	Periode 3	6.0	AM_450188
Energy System Transitions	Periode 3	6.0	AM_468019
Governance of Ecosystem Services	Periode 3	6.0	AM_468025
International Development Issues in the Context of Sustainable Development	Ac. Jaar (september)	6.0	AM_1029
Sustainable Energy Analysis	Periode 1	6.0	AM_468018
Sustainable Land Management	Periode 3	6.0	AM_1015
Value of Ecosystem Services	Periode 1	6.0	AM_468024
Water and Policy	Periode 1	6.0	AM_468023

MSc ERM, compulsory courses for all themes

Vakken:

Naam	Periode	Credits	Code
Causes and Consequences of Environmental Change	Periode 1	6.0	AM_1049
Environmental and Energy Policy Tools	Periode 4	12.0	AM_468012
Environmental Economics for ERM	Periode 2	6.0	AM_468020
Environmental Policy	Periode 2	6.0	AM_468021
Research Project	Ac. Jaar (september)	18.0	AM_468017

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

Doelgroep

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

Causes and Consequences of Environmental Change

Vakcode	AM_1049 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. A.J. Gilbert
Docent(en)	dr. A. Kalfagianni, dr. A.J.A. van Teeffelen MSc
Lesmethode(n)	Hoorcollege, Werkgroep, Computerpracticum
Niveau	400

Doel vak

To develop a common base of knowledge about the causes and consequence of environmental change and about how different disciplines perceive and address environmental problems. By the end of this course, students should be able to:

1. classify and illustrate the diversity of environmental problems;
2. explain the concepts of sustainability and growth, as well as other key concepts from the natural and the social sciences;
3. explain causality for a selection of environmental problems;
4. evaluate frameworks and indicators used in analysing environmental trends;
5. explain the roles of stakeholders and policy in dealing with environmental problems;
6. analyse an environmental problem using the DPSIR framework;
7. demonstrate skills, notably: writing, framing, presenting, and reviewing.

Inhoud vak

Without economic growth, we would not enjoy our current lifestyles. Economic growth is also needed to repair the environmental damage we have already done. Consequently sustainability cannot be achieved without growth. Identification of a path to sustainability is fraught with difficulties because many environmental problems have become 'wicked' (cf 'tame'). Wicked problems are typically associated with strong moral, political and professional issues, such that there may be little consensus about what the problem is, let alone how to resolve it. Climate change and biodiversity loss are but two examples of wicked environmental problems.

Sustainable development is seen as having three main components: the environment, the economy, and the society. These three components provide the basic disciplines addressed in this course – natural, economic and social sciences – and are used to illustrate the range and diversity of environmental problems and their analysis. The course draws on an analytical tool, the Drivers-Pressures-States-Impacts-Responses (DPSIR) framework. DPSIR serves to structure problems and to identify different disciplinary contributions to understanding, analysing and dealing with problems. It contributes to the taming of 'wicked' problems, although this may be limited to identifying where

'wickedness' lies, such as inadequate scientific knowledge, uncertainty with regards to the benefits of environmental remediation (and particularly when the costs are known), reluctance of stakeholders or societies to acknowledge or to deal with environmental change, or scale mismatches between a problem and its management.

DPSIR may be seen to comprise two 'arms': causes of environmental change (=DPS); and consequences of environmental change (=IR). Because I and R are covered in other ERM courses, notably environmental economics and environmental policy, this course places relatively more emphasis on causality. Topics range from fisheries, to poverty, to the setting of environmental standards, to stakeholders, to climate change. They have been selected to highlight the breadth of environmental sciences as well as to illustrate different disciplinary perspectives. The natural science perspective attempts to understand how environmental problems emerge. The economic perspective focuses on the growth debate (does economic growth increase social welfare?) and the use of economic instruments to redress the impacts of environmental change and to implement policy. The social science perspective assesses how environmental management can modify or redirect the patterns of behaviour that are common, if not inherent, in a given society.

Onderwijsvorm

The course comprises two types of activities. The first takes place in classes, where information is presented via lectures, presentations, workshops, debates, seminars and documentaries. This involves 55-60 hours, including student presentations for their assignment. The second takes place in students' own time, and comprises reading, preparation of presentations, a critical review (not graded), and an assignment.

Class: 50 hours

Reading and exam preparation: 40 hours

Assignment & peer review: 30 hours

Presentations: 30 hours

Critical review: 10 hours

Toetsvorm

- group activities (two presentations) worth 30% of the final grade
- assignment and peer review worth 30% of the final grade
- exam worth 40% of the final grade.

Literatuur

Boersema, J. & L. Reijnders (eds.) 2009. Principles of Environmental Sciences. Springer, Berlin. Chapters 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12 (pp 207-211), 13, 14, 23, 26, 28.

Tietenberg, T.H. & L. Lewis. 2010. Environmental economics and policy. Addison-Wesley, Boston. Chapters 6 (pp 104-118), 14 (pp 301-322), and 20 (pp 458-466).

Doelgroep

Students who have completed their bachelor's degree. Masters' students.

Overige informatie

Other lecturers:

Dr. Pieter van Beukering

Dr. Jetske Bouma

Dr. Matthijs Hisschemöller

Dr. Onno Kuik

Dr. Marja Lamoree

Guest lecturers for select topics:

Prof. Jeroen van den Bergh

Dr. Jaap Mulder

Prof. Arthur Petersen

Climate and Policy

Vakcode	AM_450188 ()
Periode	Periode 3
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. P.H. Pattberg
Docent(en)	prof. dr. ir. P. Vellinga, dr. P.H. Pattberg, E. Papyrakis
Lesmethode(n)	Werkcollege
Niveau	400

Doel vak

After studying this course, students should be able to define and explain key concepts of relevance to the climate change governance issue; understand the causes, impacts and effects of climate change and the key scientific controversies in the regime; be able to identify, explain and analyze the various policy options for mitigation and adaptation at different levels of governance; be able to understand and analyze the key political challenges in the climate change regime, the common problems facing all countries, the coalitions in the regime, the North-South, North-North, South-South, European and domestic political issues; be able to explain and assess the long-term objective, the principles, the commitments of countries and other key elements of the Climate Change Convention, the quantified commitments of developed countries, and the flexibility mechanisms under the Kyoto Protocol; be able to explain, analyze and form a judgment on the role of forestry in the climate change regime, and the various aspects of policy with respect to deforestation and land degradation; be able to define and explain the role of market mechanisms in the climate change regime, their advantages and disadvantages, and their potential in addressing the climate change problem; be able to integrate the information learnt thus far to assess and identify possible long term solutions to the climate change problem and the research questions that emerge from a study of the climate change regime; and be able to make a judgment about which principles, policy instruments and approaches are likely to be most efficient, equitable and/or effective in addressing the climate change problem.

Inhoud vak

International policy on human-induced climate change and its mitigation is a hotly debated subject. Current (international) climate policy is the result of a complex and long-lasting negotiation process at multiple levels of governance. In this process, the science of the complex earth and climate system is closely linked to questions on the socio-economic effects of climate change, the options for global environmental governance as determined by the structure of international organizations, international economic and political relations and environmental law. These close relations between earth system research and economic/political questions make this course an interesting subject

for students with a bachelor's degree in different subjects . The course includes:

- an overview of the science of climate change, its impacts (IPCC Fourth Assessment Report) uncertainties, mitigation, adaptation;
- climate change policy options at multiple levels of governance;
- analysis of the political challenges in climate change and the positions of different countries and actors;
- assessment of the international legal instruments including the Climate Change Convention and the Kyoto Protocol,
- assessment of the economics of climate change including analysing the flexible mechanisms (Emission trading, Clean Development Mechanisms, Reducing Emissions from Deforestation and Forest Degradation) and options for Post Kyoto measures; and paper discussions on a topical area of climate governance.

Onderwijsvorm

The course consists of 7-8 interactive lectures including class presentations and uses modern didactic approaches, films, and role play to help the students internalize many of the concepts and theoretical approaches developed.

Toetsvorm

The students will be examined on the basis of a paper (50%) and a closed book written examination (50%). Students must get a grade of 5.5 in each to pass in the examination.

Literatuur

Reader

Climate Modelling

Vakcode	AM_450004 ()
Periode	Periode 3
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	prof. dr. H. Renssen
Docent(en)	prof. dr. H. Renssen, dr. M.J. Waterloo, prof. dr. A.J. Dolman, dr. D.M.V.A.P. Roche
Lesmethode(n)	Werkcollege, Computerpracticum
Niveau	400

Inhoud vak

Geological archives show convincingly that the climate system experiences variability on a wide range of time-scales. For Quaternary studies, climate variations at the following time-scales are most important: glacials-interglacials, millennia and centuries-decades. This course focuses at the mechanisms behind these variations, thereby using climate models as a tool, i.e. numerical computer models in which the dynamics of the climate system are calculated. The combination of these models and geological data will be treated extensively. The course consists of lectures giving an overview of climate models and their application (different types for different time-scales) and of discussion meetings, in which students discuss the recent literature in detail. In this way the course considers case studies for the different time-scales and deals with recent developments in climate modelling. The

following two questions are central to the course: 1) What is the driving mechanism behind climate change at a particular time-scale? 2) How can we optimise the combination of climate models and geological data in order to increase our understanding of climate evolution?

Onderwijsvorm

Lectures, discussion meetings and computer exercises.

Toetsvorm

Compulsory participation in discussion meetings, computer exercises, oral presentation and written exam.

Literatuur

Lecture notes and selected papers (made available through Blackboard).

Overige informatie

The course is open for participation to students from alternative M.Sc. programmes at the VU University Amsterdam, or from other universities. If you are a professional and wish to attend this course you can also participate on a contract basis. In both cases please do contact the course coordinator to find out if you fulfill the background knowledge requirements and for enrollment procedures.

Energy System Transitions

Vakcode	AM_468019 ()
Periode	Periode 3
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. M. Hisschemoller
Docent(en)	dr. M. Hisschemoller
Lesmethode(n)	Werkgroep
Niveau	400

Doel vak

The learning objectives are to gain insight into:

- The way government and the energy sector deals with environmental issues, including the way they steer innovation;
- The concepts of industrial transformation and transition management and;
- The scientific and political debates with respect to key energy options.

Inhoud vak

Energy policies are increasingly based on the premise that government alone cannot guarantee improvement of environmental conditions and that the technological advances will not suffice given the complexity of the current environmental problems. A change toward sustainability (transition, industrial transformation) involves issues of socio-technical innovation as well as cultural and institutional transformations of the systems.

Such a change, although radical in character, will be gradual in practice as it is believed to last 25 years or more. An important new debate has emerged about the scale at which these socio-technological

and institutional changes should take place in order to achieve desired sustainability goals. Theoretical and historical aspects of system innovation and a transition towards sustainability will be addressed. The objective is to give students a critical perspective, and to make the link to questions of social and political shaping of transition processes. In working groups, the students gain experience with exploring options to stimulate long- term transition processes by using a backcasting method.

Onderwijsvorm

Lectures and workshops.

Toetsvorm

A written closed book examination (50%) and a short (1000- 2000 words) paper (50%). Both the paper and the examination must be a 5. 5 or higher. Not only the material in the reader, but also the material presented during the classes will be examined in this course.

Literatuur

Reader composed of scientific papers selected by the lecturers

Environmental and Energy Policy Tools

Vakcode	AM_468012 ()
Periode	Periode 4
Credits	12.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. R. Janssen
Docent(en)	dr. P.J.H. van Beukering, dr. A.J. Gilbert, dr. R. Janssen, drs. A.J. Wagtendonk, dr. W.J.W. Botzen, dr. E. Vasileiadou, dr. A. Kalfagianni, dr. ir. J. van Vliet, M.A.H. Schouten MSc, R. Janssen MSc, prof. dr. J. Gupta
Lesmethode(n)	Hoorcollege, Computerpracticum, Excursie, Werkcollege, Werkgroep, Deeltoets extra zaalcapaciteit
Niveau	400

Doel vak

The objective of the course is to provide the students with an overview of relevant methods and techniques for environmental resource management and to teach them how to apply these methods. At the end of the course students should know which types of methods are available, for which problems they can be used and what the strengths and weaknesses of the methods are in practice.

Inhoud vak

This course includes the following six classes of tools:

1. Systems analysis and simulation: use of simulation software (STELLA);
2. Scenario analysis
3. Spatial analysis: use of Geographic Information Systems (ArcGIS);
4. Stakeholder analysis
5. Multicriteria analysis (MCA): use of decision support software (DEFINITE);
6. Valuation and cost-benefit analysis (CBA); use of CBA software

(DEFINITE);

Systems analysis and scenario analysis are run as parallel courses (see the time table). You will need to make a choice on the first day of the course. Spatial analysis and Stakeholder analysis are also run as parallel courses. You will need to make a choice at the beginning of the second week. Your choice in the first week is independent of your choice in the second week. Multicriteria analysis and Cost benefit analysis are obligatory for all students.

Onderwijsvorm

Lectures, Practicals in computer lab, Assignments, Group project
Total contact hours 120

Toetsvorm

The first five weeks of this course are lecture weeks. For each tool there is a separate exam. The total exam grade is calculated as the average of the four tool exams. Note that you do not have to pass each tool exam as long as your average is 5.5 or higher.

The exams of the first two tools are combined and take place at the end of the spatial analysis/stakeholder analysis lectures. The exams of the MCA and CBA tools are also combined and take place at the end of the CBA lectures.

The exams (see time table for time and place) will be closed book examinations. , i.e. you will NOT be allowed to consult any course material during the examination. You can bring a simple non-programmable calculator, but no mobile phone, laptops, I-pads or other tablets.

Material relevant for the examination can be found in the Reader on Blackboard. Subjects taught in lectures and practicals are also material for the exam. Example exams for all tools and their answers can be found with the course documents on Blackboard.

The final mark for this course is calculated as the weighted (60% exam - 40% project) average of the total exam grade and the project report.

However, students have to pass both the exam and the report (>-5.5).

Literatuur

Reader 'Environmental and Energy Policy Tools'

Doelgroep

Students must at least hold a Bachelor's degree from a university or an institute of higher vocational education (with a minimum of three years of full-time study).

Overige informatie

Prof dr A.C.Petersen; Prof Dr J.Gupta;

Environmental Economics for ERM

Vakcode	AM_468020 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. P.J.H. van Beukering
Docent(en)	dr. P.J.H. van Beukering
Lesmethode(n)	Werkcollege, Werkgroep

Doel vak

This module aims to give an overview of economic policy instruments for managing environmental problems from an interdisciplinary perspective from the local through to the global level. Moreover, it will discuss the relevance of economic instruments in a large variety of policy contexts.

A critical cause of environmental problems is that not all costs falling on economic agents are borne by those responsible for generating them. This problem will be conceptualised in this course through the notion of externalities. There are various economic instruments and institutional arrangements for addressing such externalities. Criteria for their selection and evaluation will be discussed. Applications of environmental policies at various administrative levels (i.e. local, national, international), different economic sectors (i.e. water, waste, forestry, fisheries, biodiversity, trade) and different country contexts will be discussed. The course will also discuss international trade and investment related issues, as well as tackle major environmental problems, like climate change. The course will, furthermore, attempt to build bridges between economic policy instruments and other governance instruments.

After following this course, students should be able to judge how well certain policy instruments and institutional arrangements perform in terms of effectiveness, efficiency and the distribution of welfare in society.

Inhoud vak

This module will present the economic approach to environmental policy, as it has been developed in the field of environmental economics.

After having participated in this module, students should be able to answer the following questions:

What is the fundamental nature of environmental problems from an economic perspective, in relation to notions like externalities, public goods and free riding, and what does this imply for the feasibility of (easy) solutions?

Under which conditions is environmental regulation necessary or not (Coase theorem)?

Which criteria should be used to select environmental policy instruments, and to what extent are such criteria complementary or conflicting (normative theory)?

Which policy instruments are available, and what are their (dis) advantages in view of the selection criteria (in general or in particular applications) and in specific country contexts?

What are critical and debatable assumptions of core policy insights within environmental economics?

Toetsvorm

Assignment (35%), closed-book exam (65%)

Literatuur

Tietenberg, T. and Lewis, L. (2010). Environmental Economics & Policy. Pearson, International Edition, Sixth Edition. (updated information: 29 August, 2012)

Overige informatie

This course will provide a sound balance between theoretical lectures and guest lectures by academic and policy experts of a relevant field of

environmental economics. Several interactive sessions stimulate active learning of students.

Environmental Policy

Vakcode	AM_468021 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. A. Kalfagianni
Docent(en)	dr. A. Kalfagianni
Lesmethode(n)	Werkcollege, Hoorcollege
Niveau	400

Doel vak

The overall aim of the ERM master program is to enable students to develop abilities and multidisciplinary techniques which will allow them to apply to societal problems relating to natural resources and the environment. Environmental Policy contributes to this overall aim by introducing students to the actors, institutions and instruments relevant in the design and implementation of environmental policies at the local, national and supranational levels. Accordingly the course objectives -defined rather broadly are the following:

1. Give a basic understanding of the public and private actors and institutions involved in environmental governance at local, national and supranational levels.
2. Be able to evaluate the effectiveness and legitimacy of actors and institutions involved in environmental governance at local, national and supranational levels.
3. Understand and be able to explain, analyze and propose solutions regarding the complexity of decision-making structures, procedures and negotiations of environmental issues.
4. Apply the knowledge learned on the basis of two written assignments , a role-play (simulation) game and a written exam.

Inhoud vak

The course consists of four main components: (A) National Environmental Governance, (B) European Environmental Governance, (C) Global Environmental Governance, and (D) Private Environmental Governance. More specifically, part A introduces basic concepts related to environmental governance particularly at the national level. Part B introduces the history, principles, institutions and processes of EU environmental governance. Part C introduces the history, principles and institutions of global environmental governance. Finally, part D introduces newly emerging environmental governance initiatives beyond the state, discussing developments involving private actors and institutions. A general introduction and a conclusion on future prospects of environmental policy round up the course.

Onderwijsvorm

The course is worth 6 ECTS points which corresponds to 150 hours of work per student.

Toetsvorm

2 written assignments (20%) – a mid-term exam (40%) and a final exam (40%)

Literatuur

currently being revised; it will become available in September

Doelgroep

Master students

Governance of Ecosystem Services

Vakcode	AM_468025 ()
Periode	Periode 3
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. J.A. Bouma
Docent(en)	dr. P.H. Pattberg
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	400

Doel vak

The governance of ecosystem services and biodiversity is in its infancy. The current governance system has evolved through ad-hoc measures taken at national (e.g. protection of forests and wetlands), supranational (e.g. EU Bird's directives) through to international levels (e.g. Convention of Biological Diversity). However, the governance of comprehensive approaches to ecosystem and biodiversity protection has yet to emerge. There is considerable literature on the linkages between biodiversity, ecosystems and ecosystem services and their (economic) value, but studies and policies on how these values can be effectively incorporated into policy making and how the provisioning of ecosystem services can be safeguarded are much more scarce. This course will discuss the emerging literature; address policy and legal frameworks for ecosystem and biodiversity governance, identify and debate on the different instruments for ecosystem management; elaborate on the multi-scale and multidimensional challenges of ecosystem services; and discuss the politics and economics of this complex and emerging field. After having participated in this module, students should be able to assess and form judgments on:

- The characteristics of ecosystems and biodiversity and how these relate to the governance of ecosystem services and biodiversity worldwide
- What policy instruments are available at different governance levels and what the strengths and the weaknesses of the different policy instruments are.
- The trade-offs associated with the protection of ecosystems and biodiversity and how the interests of local communities can be incorporated in ecosystem and biodiversity governance.
- The current best practice examples of ecosystem services and biodiversity governance and ways forward to safeguard the protection of ecosystem service provisioning in the long run.

Inhoud vak

The course will focus on how ecosystems are currently managed and what would be required to safeguard the provision of ecosystem services in the long run. It will discuss the concept of ecosystem services, and its critiques, discuss the different types of policy instruments at different governance levels, introduce the existing national and international legal frameworks for ecosystem and biodiversity conservation, discuss the challenges associated with payments for ecosystem payments, and their effective design, introduce the concept of community co-management and private-public partnerships in ecosystem service provisioning, and provide an understanding of the different policy instruments available to govern ecosystems and protect biodiversity at multiple scales.

Onderwijsvorm

This course has 6 credits. This implies that there is a study load of 168 hours on students. The course has 32 contact hours; 7 lectures, 2 working sessions, 1 presentation session and 1 concluding session/wrap up. For each of the lectures, we selected 3 academic papers for you to study; in total 21 papers, plus the power points. In addition, we expect you to select an additional 4 peer-reviewed papers for your case study paper. The readings are provided as full papers and aim to give you a broad understanding of the issue concerning ecosystem and biodiversity governance as befits a master's programme. The structure of the lectures in class will help you identify the key questions on which you will be examined.

Toetsvorm

The students will be asked to select a topic which will form the basis for a presentation and a paper. The course ends with a closed book examination. The examination will count for 50% of the final results, the paper for the other 50%. Students should pass both paper and exam.

Literatuur

See Study Manual (which will become available December 2013. It will contain 21 academic papers. If you want to get an impression of the literature requirements please contact the coordinator for last year's study manual).

Aanbevolen voorkennis

Students are encouraged to also take course 468024 'Values of ecosystem services and biodiversity'.

Doelgroep

MSc students Environmental Resource management (doctoral students or other MSc students are also welcome: please contact the coördinator)

Overige informatie

Several guest lecturers will give presentations, like for example from the Initiative Sustainable Trade (IDH-on certification), IUCN (on community co-management), the Dutch Environmental agency (PBL- on legal frameworks for ecosystem protection) and the Dutch development bank (FMO- on financing biodiversity protection). Given the heavy study load, students are discouraged to register for more than one specialization course.

International Development Issues in the Context of Sustainable Development

Vakcode	AM_1029 ()
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. A. Kalfagianni
Docent(en)	dr. P.H. Pattberg, prof. dr. F.H.B. Biermann, dr. A. Kalfagianni, prof. dr. J. Gupta
Lesmethode(n)	Werkcollege
Niveau	500

Doel vak

This course aims to provide Master's students at Dutch universities with a broad perspective of the complexity and interrelatedness of both scholarly studies and the practical and political dimensions of international development issues in the context of sustainable development. The course is also relevant for PhD candidates in the earlier phases of their trajectory, notably for PhD candidates in the context of the CERES and SENSE Research Schools.

The course is built around the first part of the annual series of lectures by internationally renowned experts at VU University, organized by the Society for International Development (Dutch Chapter), which focus on different themes every year. These lectures will be complemented by 5 additional workshops that will provide a common academic basis. The workshops will help students to relate the basic course material with the highly topical SID lectures.

Inhoud vak

The course focuses on:

- a) The evolving nature of development (economic, social and environmental) challenges;
- b) Development & Development Cooperation: the history of development cooperation and lessons learnt; prognosis about the future of development cooperation;
- c) The role of the state and state sovereignty;
- d) Grand challenges;
- e) Globalisation.

Learning goals

After studying this course, students should:

- Be able to define and explain key concepts of relevance to international development in the context of sustainable development;
- Understand the causes and impacts of international development challenges;
- Be able to identify, explain and analyze the various principles, declarations and policy options for coping with international development challenges;
- Be able to understand the key political challenges that may hamper the adoption of such policy options at international level and at the North-South, North-North, South-South level;
- Be able to analyze the key challenges that may hamper the implementation of relevant policy options at multiple levels of governance;
- Be able to make links between the general theoretical issues and the

individual SID lectures and to integrate the information; and

- Be able to make a judgment about how international development issues need to be addressed in the 21st century.

Onderwijsvorm

Lectures and debate, workshops

Dates of VU Workshops

16 September: What is development
14 October: New actors in development cooperation
4 November: Non-state actors and development
25 November: Urbanization and development
2 December: Environment and development
16 December: student presentations
20 December: final examination

Toetsvorm

The final mark of this course is composed of three parts:

1. A written exam, which counts for 50% of the course grade.
2. A paper of 2.000 words, which counts for 30% of the course grade.
The students will choose one topic, to be approved by the course coordinator, for his/her paper, demonstrating the students' progress and achievements in knowledge, understanding and personal well-founded opinion on international development, in relation to the student's own disciplinary background, to the interrelations between the relevant academic disciplines and between academic and political perspectives on the issues.
3. A short summary in blog format of (one of) the SID lectures' central topics which will be later discussed in class, which counts for 20% of the course grade. In collaboration with SID one or more of the best student summaries will appear on the SID blog page (see <http://sid-nl.org/sidblog/>).

Active participation in the workshops and attendance of the SID lectures are obligatory. In order to pass, all parts should at least be marked with a 5.0 and the final score must be higher than a 5.5.

Literatuur

Textbooks and Reference Volumes

Desai and Potter. (2008). The Companion to Development Studies. Hodder

Journals

World Development
Journal of Development Studies
Journal of International Development
Development & Change
European Journal of Development Research
Studies in Comparative International Development
Third World Quarterly
Journal of Human Development and Capabilities

Major Sources for Policy Papers on Development

World Bank

OECD Development Assistance Committee

Oxfam: <http://www.oxfam.org>

The Bretton Woods Project: <http://www.brettonwoodsproject.org/>

The Initiative for Policy Dialogue: <http://www0.gsb.columbia.edu/ipd>

Doelgroep

Aimed at Master's students with global, international and developmental interests. For more information please contact dr. Agni Kalfagianni (a.kalfagianni@vu.nl).

Overige informatie

Period: September-January, with one SID lecture per month on a Monday evening, 5-7 pm (see separate SID program). Accompanying VU lectures and workshops are all held as well on Monday evenings, 5.15 – 7.15 pm, room WN-M648 (except for Tuesday 4 November).

Registration until September 9 with one of the following ways:

1. VU students: registration through VUnet
2. Students from other universities: register as a "bijvak" student, after registration at the VU, the course can be booked through VUnet
3. Non students: please contact the course co-ordinator: agni.kalfagianni@vu.nl

Modern Climate Systems

Vakcode	AM_450185 ()
Periode	Periode 1
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. G.M. Ganssen
Docent(en)	dr. G.M. Ganssen
Lesmethode(n)	Werkcollege
Niveau	400

Doel vak

To understand the physical and chemical processes that control atmosphere and ocean.

Inhoud vak

This introductory course gives a (short) overview into the physical and chemical processes driving the atmosphere and the ocean. Knowledge of the modern climate processes forms the basis for understanding Climate Change today and in the past.

Knowledge to gain about:

- the basic parameters and properties of atmospheric and ocean examples
- processes leading to the formation and circulation of air and water masses
- characterization of climatic regions of the world from the poles to the tropics
- special features of the climate systems like the monsoon, ENSO and NAO systems

Onderwijsvorm

Lectures and workshops, literature reading.

Toetsvorm

Written exam

Literatuur

Lecture notes, selected papers and Ruddiman, W.F., 2008. Earth's Climate: past and future. W.H. Freeman and Company New York.

Modern Geo-ecosystems

Vakcode	AM_450313 ()
Periode	Periode 1
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. G.M. Ganssen
Docent(en)	dr. G.M. Ganssen
Lesmethode(n)	Werkcollege, Excursie
Niveau	400

Doel vak

To understand the interactions between the geo-, bio-, hydro- and atmosphere in a selected number of modern terrestrial and marine geo-ecosystems. Special focus is given on both the natural processes and the human impact during the Anthropocene.

Inhoud vak

Anthropogenic changes to the Earth's climate, land, oceans and biosphere are now so huge and rapid that the concept of a new geological epoch defined by the action of humans, the Anthropocene, is widely and seriously debated.

Knowledge to gain about:

- scale, magnitude and significance of modern environmental change especially in relation to Earth's geological history.

Onderwijsvorm

Lectures, literature study, student presentations (45 minutes, teaching each other by lecturing) and essay writing.

Toetsvorm

Oral presentation, written essay

Literatuur

Lecture notes, selected papers.

Philosophy of Political Science and Research Methods

Vakcode	SPPSRM_O (705733)
Credits	5.0
Voertaal	Engels
Faculteit	Faculteit der Sociale Wetenschappen
Coördinator	prof. dr. B.J.J. Crum
Docent(en)	prof. dr. B.J.J. Crum
Lesmethode(n)	Werkgroep

Doel vak

The objective of this course is to enable students to critically reflect upon the methodological choices involved in political science research and to justify their own choices, linking the levels of epistemology, methodology and techniques.

More specifically, the course aims to enable students to:

- recognise and reflect upon various research traditions in the social and political sciences (positivist, hermeneutical and critical approaches) and the ideas about the relation of theory and observations that they involve;
- familiarise students with the formulation of a research design and the application of suitable political science techniques to the analysis of political phenomena;
- justify methodological choices in setting up a research design.

Inhoud vak

Led by the question 'What is good political science?', students are taught to identify different criteria that have been proposed to demarcate 'good' political science, and to reflect upon the validity of these criteria. We will be looking at the level of research techniques as well as that of methodology and of epistemology. Linking this knowledge to their research work for other courses and their thesis, students are expected to explicate their methodological positions and to be able to justify them against alternative approaches. Thus students are to develop their insight in addressing research questions and in developing appropriate research designs.

The course is structured as a seminar in which students participate actively and learn how to apply research techniques while reflecting upon them in a critical way. The assignments allow the students to link the class teachings to their own research interests.

Toetsvorm

The clean sweep test is a 'hand in assignment'. For information about the assignment contact the course coordinator. Find the hand in dates on: <http://www.fsw.vu.nl/en/students/schedules/clean-sweep-tests/index.asp>.

Literatuur

* Patrick Baert (2005), Philosophy of the Social Sciences, Cambridge: Polity Press.

* Additional literature will be announced in due course via Blackboard.

Vereiste voorkennis

Admission to the MSc Political Science or to the Masters in Social Research, track; Political Science.

Doelgroep

Master students.

Overige informatie

Please note: this course is not taught during the academisch year 2011-2012. Only a clean sweep test is provided.

Political Concepts and Processes

Vakcode	SPCP_O (705732)
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Credits	5.0
Voertaal	Engels
Faculteit	Faculteit der Sociale Wetenschappen
Coördinator	dr. P.J.M. Pennings
Docent(en)	prof. dr. C.J. van Kersbergen
Lesmethode(n)	Werkgroep

Doel vak

The aim of this course is to familiarize students with central concepts and approaches relevant to both International Relations and Comparative Political Science research. Specifically: 1) to develop students' knowledge of the history and the foundations of Political Science in relation to the philosophy of the social sciences; 2) to provide insight in the position, role and capabilities of main political actors; 3) to place the study of domestic and international politics in a broader theoretical context; 4) to train students' ability to identify and apply core concepts of Political Science; 5) to stimulate critical theoretical and normative reflection.

Inhoud vak

We focus on whether and how central concepts used in Political Science are affected by the current (global) phenomenon of transnationalization. We try to learn from the history of Political Science as a discipline and we study the current state of the art in various fields of research, including the development of theory and of methods of (comparative) political inquiry. For example, we deal with notions of 'democracy' and 'democratisation'. What does this concept mean? How do democratic processes work? What is the role of institutions, the judicial system, of political parties and interest groups in modern societies? How is 'democracy' developed over time? How is it used in the various sub-disciplines? How is 'democracy' (national, European, global) affected by the processes of European integration and of transnationalization? Similarly, we explore how the meaning and use of other central concepts have changed over time, and how the phenomena they describe are being shaped by current forces of transnationalization and European regional integration. In addition, we use the history of Political Science to illustrate which approaches have been used in research in the past and how methods of analysis have developed and changed over time, from purely descriptive approaches to modern techniques of political inquiry and critical reflection. Finally, we will apply selected Political Science concepts to concrete contemporary issues in politics, exploring to which extent and how the structure of domestic politics is increasingly being influenced by Europeanization and globalization and how the interaction between International Relations theory and Comparative Political Science is gradually developing in the study of international politics and the EU.

Toetsvorm

The clean sweep test is a 'hand in assignment'. For information about the assignment contact the course coordinator. Find the hand in dates on: <http://www.fsw.vu.nl/en/students/schedules/clean-sweep-tests/index.asp>.

Literatuur

Selection of articles from major journals (to be announced).

Vereiste voorkennis

Admission to the MSc Political Science or to the Masters in Social Research, track Political Science.

Doelgroep

Master students.

Overige informatie

Please note: this course is not taught during the academisch year 2011-2012. Only a clean sweep test is provided.

Research Project

Vakcode	AM_468017 ()
Periode	Ac. Jaar (september)
Credits	18.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	drs. M.I. Tromp Meesters
Docent(en)	drs. M.I. Tromp Meesters
Lesmethode(n)	Werkcollege
Niveau	500

Doel vak

The objectives of this course are:

To become acquainted with environmental research and policy in practice;

To apply the theoretical frameworks elaborated in the former ERM courses in a specific context;

To apply the disciplinary knowledge and skills, obtained in former studies and ERM courses to a real life problem;

To write an environmental report independently.

Inhoud vak

The subject is chosen based on the interest of the students as much as possible, and can be proposed by the students themselves or be proposed by the supervisors.

There are two options:

- Internal research project. A research placement at the Institute for Environmental Studies (IVM), or within the VU.

- External research project. A research placement externally, e.g. at a company or an (international) governmental organisation. The Institute for Environmental Studies (IVM), as an internationally oriented research organisation, has a large network of outstanding environmental institutes and (non) governmental organisations that can supervise students doing research externally.

Onderwijsvorm

The main product of this course is an environmental report that includes an introduction, a research question, a methodological section, results, discussion and conclusion. Independent, individual (peer reviewed and grey) literature research, gathering data from databases, interviews and modelling are some of the methods possible.

Toetsvorm

The products of this course are an environmental report and a presentation. It may include a computer model, a website or another multimedia product. The actual research, including the Master thesis contributes 90% to the final grade, and the presentation 10%.

Literatuur

The literature review is depending on the subject and the option chosen.

Vereiste voorkennis

Students must have obtained a minimum of 18 EC in the ERM programme by the 15th of February, 2013, and must have participated in the team work assignment of the course Environmental and Energy Policy Tools (AM_468012).

Aanbevolen voorkennis

Students are strongly recommended to have followed: Environmental Economics (AM_468020) and Environmental Policy (AM_468021)

Overige informatie

The Research Placement is subject to the FALW Work Placement and Thesis Regulations. These regulations require detailed written agreements between supervisor and student that specify the conditions for the Research Project. Please consult the Faculty's website for more information.

Sedimentary Environments and Climate Archives

Vakcode	AM_450330 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. F.J.C. Peeters
Docent(en)	dr. F.J.C. Peeters, dr. C. Kasse, dr. S.J.P. Bohncke, dr. M.A. Prins
Lesmethode(n)	Excursie, Werkcollege
Niveau	400

Doel vak

To learn and understand how environmental and climate changes are recorded in marine, coastal and terrestrial depositional environments, and to understand the recording process as a function of the dynamics of these environments.

Inhoud vak

The course deals with the sedimentology, geochemistry and stratigraphy of marine, coastal, fluvial, lacustrine, eolian, and periglacial palaeoclimate records. The focus is on those processes relevant for understanding how climate/environmental change is recorded in the different palaeoclimate archives. In addition, the susceptibility of key aspects of those environments to climate- change impacts will be addressed. Marine and terrestrial palaeoclimate records receive equally

attention.

Onderwijsvorm

Lectures, literature study, group discussions .

Toetsvorm

Written exam and report of the field excursion to Zuid-Limburg.

Literatuur

Lecture notes, selected papers.

Aanbevolen voorkennis

Bachelor courses: Terrestrial environments (450097), Climate Science (450240);

Master courses: Modern Climate Systems (450185), Modern Geo-ecosystems

Doelgroep

Master students Earth and Environmental Geosciences

Master students in Paleoclimatology

Sustainability and Growth

Vakcode	AM_468011 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. A.J. Gilbert
Docent(en)	dr. A.J. Gilbert, prof. dr. J.J. Boersema
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Doel vak

Sustainability & Growth uses the DPSIR analytical framework to present the breadth of environmental problems, and the different disciplines employed in the analysis of their causes, effects and possible solutions. It is the first course in the Environmental and Resource Management (ERM) programme and is followed by all students from all specialisations. It serves to develop a common base of knowledge that subsequent courses will develop further.

By the end of this course, students should be able to:

- classify and illustrate the diversity of environmental problems;
- explain the concepts of sustainability and growth, as well as other key concepts from the natural and the social sciences;
- explain causality for a selection of environmental problems;
- evaluate frameworks and indicators used in analysing environmental trends;
- explain the roles of stakeholders and policy in dealing with environmental problems;
- analyse an environmental problem using the DPSIR framework;
- demonstrate skills, notably writing, framing, presenting, and reviewing.

Inhoud vak

Without economic growth, we would not enjoy our current lifestyles. Economic growth is also needed to repair the environmental damage we have already done. Consequently sustainability cannot be achieved without growth. Identification of a path to sustainability is fraught with difficulties because many environmental problems have become 'wicked'. Wicked problems are typically associated with strong moral, political and professional issues, such that there may be little consensus about what the problem is, let alone how to resolve it. Sustainable development is seen as having three main components: the environment, the economy, and the society. These three components provide the basic disciplines addressed in this course – natural, economic and social sciences. The course draws on an analytical tool, the Drivers-Pressures-States-Impacts-Responses (DPSIR) framework. DPSIR serves to structure problems and to identify different disciplinary contributions to understanding, analysing and dealing with problems. It contributes to the taming of 'wicked' problems, even if this is limited to identifying where 'wickedness' lies such as inadequate scientific knowledge or uncertainty with regards to the benefits of environmental remediation. DPSIR may be seen to comprise two 'arms': causality of environmental problems (=DPS); and consequences of environmental problems (=IR). Because I and R are covered in other ERM courses, Sustainability and Growth emphasises causality. Topics range from fisheries, to poverty, to the setting of environmental standards, to the inclusion of stakeholders, to climate change.

Onderwijsvorm

The course involves lectures, student presentations, student reviews, workshops, debates, seminars and a documentary

Toetsvorm

The final grade for Sustainability & Growth is derived from:

- 1) group activities worth 30% of the final grade
- 2) an assignment and peer review worth 30% of the final grade
- 3) an exam worth 40% of the final grade.

To pass the course, students must receive a grade exceeding 5.0 (out of 10) for the exam and their overall grade must exceed 5.5. There is one re-sit of the exam. Students who are graded 5.5 or lower for the assignment have one opportunity to revise it.

Literatuur

Available via the online reader on Blackboard:

Boersema, J. & L. Reijnders (eds.) 2009. Principles of Environmental Sciences. Springer, Berlin. Chapters 1, 2, 4, 5, 6, 7, 8, 10, 11, 12 (pp 207-211), 13, 14, 23, 26.

Required text for Environmental Economics.

Tietenberg, T.H. & L. Lewis. 2010. Environmental economics and policy. Addison-Wesley, Boston. Chapters 6 (pp 104-118), 14 (pp 301-322), and 20 (pp 458-466).

Vereiste voorkennis

Admittance to ERM

Doelgroep

Students interested in a broad understanding of the environmental sciences.

Sustainable Energy Analysis

Vakcode	AM_468018 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	E. Papyrakis
Docent(en)	prof. dr. J.J.C. Bruggink, E. Papyrakis
Lesmethode(n)	Werkcollege, Hoorcollege
Niveau	400

Doel vak

After following this course the students are able to:

- Make use of scientific information about major energy resources and conversion processes to assess the economic and environmental impacts of existing and new technologies in the energy sector;
- Apply this scientific information in the widely different contexts of industrialised, emerging and least developed nations;
- Assess the potential; and implications of using wind, solar and biomass; technologies in both rich and poor nations;
- Evaluate the sustainability implications of different; fossil fuel; technology choices in a comprehensive and balanced way;
- Explain the environmental risks and supply potential of nuclear energy.

Inhoud vak

The role of conventional and renewable energy on the road towards sustainability forms the main topic of this module. Energy use drives economic development while at the same time causing persistent environmental problems. Assessing energy technology in the light of the long- term transition towards sustainability requires a basic understanding of available energy resources and conversion processes including their environmental impacts and opportunities for performance improvement. Moreover, the potential role of energy technologies is strongly dependent on the stage of economic development of the region and sector where it will be applied. The following subjects will be dealt with in more detail:

- Introduction to energy technology assessment and global energy use patterns;
- Biomass technology applications in developed and developing nations
- Wind and solar technology applications in developed and developing nations
- Fossil fuel resources and sustainability;
- Nuclear energy resources and sustainability.

Onderwijsvorm

Lectures, team assignment and workshop

25 hs for the Dragon's Den assignment and 195 hs for lectures.

Toetsvorm

A written exam (80%) and a team presentation on the assignment (20%).

Literatuur

Reader with open source literature

Sustainable Land Management

Vakcode	AM_1015 ()
Periode	Periode 3
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	drs. W.A.M. Tuijp
Docent(en)	dr. W.R.S. Critchley
Lesmethode(n)	Werkcollege
Niveau	400

Doel vak

What are the enabling and limiting factors to sustainable land management? How can smallholder farmers in the developing world adapt to climate change? What can farmers in developing countries – and especially Africa – do to improve their food security? Can organic agriculture help feeding the world? Are biofuels the solution for our energy needs of tomorrow?

These and many other questions will be discussed during this interdisciplinary course. Its main focus is on what can be done about the problems of soil erosion and land degradation, and their relevance to climate change and poverty reduction. "Sustainable Land Management" is a new approach that involves both people and technical issues. The course spans a wide range of topics, including environmental problems, history of approaches, conservation technologies in the field, indigenous knowledge, working with local people, and skills in research and development in the tropics. There is a combination of theory and practice, with a strong emphasis on illustrated case studies from over 20 countries.

Inhoud vak

Environmental degradation and rural poverty: processes and impact. History of conservation: from failed approaches to new concepts in rural development; principles and practices of Sustainable Land Management (SLM). Agriculture in Development. SLM technologies: humid areas/dry areas. International environmental protocols and their impact on rural development programs. Socio-economic factors including population/land tenure/gender/incentives/marketing and labeling. Energy and biofuels; biodiversity, genetic modification and organic production. ICTs in rural development. Indigenous knowledge and local innovation, Participatory learning and action, including research methodology).

Onderwijsvorm

Interactive lectures (about 38 hours in total) with illustrated case studies supplemented by group work activities; conducted and examined in English.

Toetsvorm

One topic will be chosen by each student for a paper of 3.000 words based on further reading (50% mark). There will also be a final examination (50% mark).

Literatuur

"Where the land is greener" WOCAT, Eds Liniger and Critchley, plus additional supporting literature.

<https://www.wocat.net/en/knowledge-base/documentation-analysis/global-overview-book.html>

Doelgroep

Aimed at Master's students with environmental and developmental interests: especially those with some geography/earth science/hydrological/biological/ecological/environmental background, but social scientists can also benefit from this course.

Overige informatie

Comments from former students:

"I think this course gives a good overview and helps students with a non environmental background to understand essential issues."

"Good job, keep on going! Continue to be part of the ERM programme."

"Whereas other courses focus on scientific dimension of environmental problems SLM is also about the human dimension of environmental solutions. It is one of the few courses that gives a positive perspective for practical solutions. Whereas other courses try to inject "knowledge" theoretical problems and solutions."

"The course was a great launch pad for my thesis research. "

"This should be a specialization track! Sustainable Land Management 2 would be very interesting and give students more time to learn about the topics."

For more information please contact Wendelien Tuyp (w.a.m.tuijp@vu.nl)

Theories and Approaches in International Relations

Vakcode	S-TAIR_O (705738)
Credits	5.0
Voertaal	Engels
Faculteit	Faculteit der Sociale Wetenschappen
Coördinator	dr. P.H. Pattberg
Lesmethode(n)	Werkgroep

Doel vak

This course provides students with an encyclopaedic overview of the traditions, approaches, (meta-) theories and key concepts in the field of International Relations (IR) broadly conceived. Its principal aim is to provide the students with a common basis with regard to the theoretical foundations of IR.

More concretely it aims:

- to provide students with an encyclopaedic overview of the theoretical foundations of IR, thus enabling them to analyse concrete historical developments from various theoretical perspectives;
- to teach students to critically reflect upon the meta-theoretical foundations - and their methodological and normative implications - of (social science) theory and thus to develop students' knowledge of the history and the foundations of the philosophy of social sciences (increasing their reflexive knowledge of both the main traditions and of paradigmatic change);
- to advance students' understanding of the epistemological issues involved doing political research and thereby rendering them capable of developing coherent research designs
- to familiarize students with the critical assessment of political science literature, in particular by placing it within a historical context and by reflecting upon both the social constitution of theory as well as its socially constitutive effects;

Inhoud vak

Whereas IR traditionally (and narrowly) defined deals almost exclusively with relations between states, the 'discipline' has moved much beyond such a narrow state-centrism in order to embrace a much broader conception of world politics in which there is attention to both state and non-state actors and both interstate and other global social structures. This broader conception of world politics is point of departure for this introductory course and is in fact taken one step further by departing from the notion that contemporary world politics is of a fundamentally transnational nature. Thus, politics is not just between states but also the political struggle between various transnational interest groups, movements and social forces. Although there is no world polity, there is a European polity, and internationally there are numerous international organizations that constitute institutionalized structures of global governance. Policy, finally, is not just produced by states as foreign policy, but also by the aforementioned international organizations and by the EU. A second characteristic is that although we consider IR as a mature sub-discipline of political science which is grounded in various approaches and methods of general political science (and therefore clearly linked to the other stream of the MSc in Political Science), we also recognize the contributions from other disciplines (including philosophy, economics, sociology, anthropology, and law) to the field and stress the importance of interdisciplinary research. This course is structured as a historical overview of the development of the discipline, placed in a wider historical context of 'real-world' developments in the global system - stressing the obvious links between those developments and the development of theory - as well as in a wider social science context, trying to see how IR theory developed in relation to other disciplines and to wider debates within the social sciences. Next to the historical context considerable attention is given to the meta-theoretical assumptions (and methodological implications thereof) underlying various approaches and theories as we believe that these are key to understanding the major debates, and that - for their own research - it is important that students critically reflect upon those assumptions.

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Onderwijsvorm

Tutorial. Building on prior knowledge of students (i.e., students from our Bachelor's programme are assumed to have basic knowledge of the IR and European integration literature used in the bachelor, and students coming from outside to have an equivalent knowledge), students will work through the literature in tutorial form. For each session students must prepare one page in which they answer one or several critical questions pertaining the prescribed literature. The total amount of reading will be about a 100 pages per session.

Toetsvorm

Testamur based on participation; (30 %) and three essays (70 %).

Literatuur

* Burchill, Scott; et al (2009). Theories of International Relations, 4th ed. London: Palgrave (to be bought).

* Reading list (will be available during first class).

Vereiste voorkennis

Admission to the MSc Political Science or to the Masters in Social Research, track; Political Science.

Doelgroep

Master students of the specialized tracks International Relations & Transnational Governance and Global Environmental Governance.

Intekenprocedure

It is obligatory to sign up for a course, for more information on dates to sign up, go to www.fsw.vu.nl/schedules.

Value of Ecosystem Services

Vakcode	AM_468024 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. P.J.H. van Beukering
Docent(en)	dr. P.J.H. van Beukering
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak

One of the hot topics in environmental management today is the concept of ecosystem services. This concept can be defined as the benefits that people obtain from ecosystems. Quantification and apportionment are major challenges. Important ecosystem services are food, fuel, timber and water provision, carbon storage and sequestration, soil formation, climate and disease regulation, aesthetic benefits and spiritual values. Biodiversity, or the variety of life forms that populates and modifies our earth, can be seen as the main underlying asset from which all ecosystem services are produced. By putting ecosystem services central in the debate on nature conservation, the societal benefits of nature conservation and the need to align conservation and development goals are stressed. This course aims to assess the importance of ecosystem services and biodiversity for nature, the economy and people in both developed and developing countries.

Inhoud vak

The course focuses on an understanding of what specific services are provided by which component of ecosystems, how these are linked to specific elements of biodiversity and the problems arising from scaling and multiple roles. It attempts to remain close to the practicality of specific quantification. It will then continue to address the economics of ecosystem services. Various ecosystems (e.g. forests, coral reefs, wetlands, rivers) and forms of biodiversity is covered (e.g. wildlife, flora). Next to lectures and debate, the course contains a two-week case study carried out in groups of 3-4 students. Task is to quantify all services in a specific ecosystem by means of a rapid appraisal method. During the previous lectures, students have developed their research protocol, which then will be ready for application in the case study.

After having participated in this module, students should be able to

answer the following questions:

What is an ecosystem and how are ecosystems changing over time and space?

What services do ecosystems and biodiversity provide and how can these services be measured?

What is the economic importance of the ecosystem services and biodiversity and what drives these economic and cultural values?

What instruments are available to mobilise payments for ecosystem services necessary for sustainable management of ecosystems and biodiversity?

How to conduct a rapid appraisal of ecosystem services taking into account the above-mentioned issues?

Onderwijsvorm

- A group case study presentation and a final report;

- The course ends with a closed book exam;

The exam weighs 70%, the group assignment (presentation & final report) 30%.

Students must pass all (5.5 or higher).

Toetsvorm

A group case study presentation and a final report;

The course ends with a closed book exam;

The exam weighs 70%, the presentation 10% and the final report 20%.

Students must pass all (5.5 or higher).

Literatuur

To be announced by August 2013

Overige informatie

Prof Dr Peter Verburg (IVM-VU University)

Dr Mathew Parr (IUCN)

Dr Rudolf de Groot (Wageningen University)

Dr Ben ten Brink (PBL, Netherlands)

Water and Policy

Vakcode	AM_468023 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	prof. dr. J.C.J.H. Aerts
Docent(en)	dr. H. de Moel, prof. dr. J. Gupta
Lesmethode(n)	Hoorcollege, Computerpracticum
Niveau	400

Doel vak

The objective of this course is to understand how water related processes such as floods and droughts influence our society and what role water management plays in addressing and tackling these issues.

This course aims to provide students a multi-disciplinary understanding of water management, including the physical dimensions of the problem, the policy, law and long term trends such as climate change and land use change. It puts emphasis on the uncertainty of future trends and how

risk management methods can be helpful for water managers for dealing with these uncertainties. Key goals for students to reach at the end of the course are:

- To understand the complexity of various water related issues (e.g. scarcity, floods, and droughts) with its interaction of natural and socio-economic dynamics.
- To learn what kind of measures can be taken to alleviate water related problems and what kind of positive and negative effect these measures have on different users.
- To be able to systematically approach a complex and integrated water related issue and properly interpret data and information about this issue.

Inhoud vak

Water managers see themselves confronted with a continuous stream of increasingly credible scientific information on the potential magnitude of population growth, economic activities and climate change that increase the risk related to the earth hydrological system. It is expected that floods and droughts will increasingly affect societies and economies and new approaches in water management are needed to deal with these challenges. Furthermore, developing adequate water policies that can be used in practice is a difficult issue and is the result of a complex and long-lasting process from the national through to the local level. In this process, the science of the water- and socio-economic systems can play an important role by supplying policy makers with answers on e.g. the socio-economic effects of floods and droughts. Uncertainty in future trends further puts new challenges to water management and risk based techniques can be helpful in dealing with these uncertainties. Finally, water management increasingly needs to cooperate with spatial planners, especially in large cities, to address increasing risk from storm surges and sea level rise.

Onderwijsvorm

This course consists of several sessions going into different subjects related to water management. These sessions will consist of lectures by the professors with interactive discussion; some practical assignments, and student presentations. Apart from these sessions, you will team up in pairs of two students to write papers on water related issues and adaptation in cities, which will be peer-reviewed by other students.

Activity Hours

- 1 Attending and contributing to sessions (12 times 3 hrs) 36 hours
- 2 Readings associated with lectures 28 hours
- 4 Paper: literature review (32 hours), writing (24 hours), peer review (8 hours) 64 hours
- 5 Exam preparation 40 hours
- TOTAL 168 hours

Toetsvorm

Written exam (50%), essay (40%) and peer-review (10%)

Literatuur

The literature for this course consists of various academic papers and chapters. This list is subject to possible changes.

- Bengtsson, L. (2010). The global atmospheric water cycle. *Environmental Research Letters*, 5 025202.
<http://iopscience.iop.org/1748-9326/5/2/025202>
- USGS hydrological cycle education website (PDF on blackboard)
- Water balance components (PDF on blackboard)

- Pechlivanidis, I.G., Jackson, B.M., McIntyre, N.R., Wheeler, H.S. (2011). Catchment scale hydrological modelling: a review of model types, calibration approaches and uncertainty analysis methods in the context of recent development in technology and application. *Global NEST Journal*, Vol 13(3), pp 193-214. https://doc-00-5s-docsviewer.googleusercontent.com/viewer/securedownload/tflg28lh78hf3eco9i5gvj1f7b1v3v1k/dcarmkfl5nbvp813s3ql5bbpu2simltj/1359630900000/Ymw=/AGZ5hq_6v1h8eHm5fZ0ge1R0Az4h/QURHRUVTaDd6M0ZXRFZ0UWpyNVJuX0tVc1dQWDBMMI9RaWhDeloyYwTLOTdFMmh3QjZLZC1UNTFUcTBLSoDTOUdDZVZXdUkzck85UFNaTTFpcUtXVEZBUHU1RmJiQmxnN01DdVoyTjJkWmlsaG4xWkg5dmljbENkMIFncWVBckRmQ0NObmQwNmhkZ1k=?docid=fdba3f0f3f41752a195e3c521b3d1ea4&chan=EgAAALA82VBJ%2B8CQR11OM4zPMTpZbm7VQuf0gR2T77AXafcb&sec=AHSqidbSk5iHEP2IBE3P-fSXZEomCg_dcbQL1gpXtejby1dKoqOj8gaKoljylnQRodr5R53hMBSm&a=gp&filename=193-214_778_Pechlivanidis_13-3.pdf&nonce=nd6mu04m24p8g&user=AGZ5hq_6v1h8eHm5fZ0ge1R0Az4h&hash=fanf4gbjr0mmj2aabfvkuohlt8e001u •••
- Droogers, P., Immerzeel, W.W., Terink, W., Hoogeveen, J., Bierkens, M.F.P., Van Beek, L.P.H. and Debele, B., 2012. Water resources trends in Middle East and North Africa towards 2050. *Hydrology and Earth System Sciences*, 16, 1-14. doi:10.5194/hess-16-1-2012. <http://www.hydrol-earth-syst-sci.net/16/3101/2012/hess-16-3101-2012.pdf>
- Daniel P. Loucke and Eelco van Beek, 2005. *Water Resources Systems Planning and Management – an introduction to Methods, Models and applications*. UNESCO, France and WL|Delft Hydraulics, Netherlands: Appendix C: p. 581-590 (sections 1,2,3,4) <http://ecommons.library.cornell.edu/handle/1813/2804>
- Funke, N., Oelofse, S.H.H., Hattingh, J., Ashton, P.J. and Turton, A.R., 2007. IWRM in developing countries: lessons from the Mhlatuze catchment in South Africa. *Physics and Chemistry of the Earth* 32(15-18), pp. 1237-1245. doi:10.1016/j.pce.2007.07.018. <http://www.sciencedirect.com/science/article/pii/S1474706507001039>
- Taikan Oki and Shinjiro Kanae: *Global Hydrologic Cycle and World Water Resources*, Science, Vol. 313. no. 5790, pp. 1068-1072, 2006. DOI: 10.1126/science <http://www.sciencemag.org/content/313/5790/1068.full.pdf?sid=8b7e546f-0ac7-4c38-9599-779ec23efb9b>
- Hoff, H, Falkenmark, M., Gerten, D., Gordon, L., Karlberg, L. and Rockstrom, J.: Greening the global water system, *Journal of Hydrology*, Vol. 384, pp. 177-186, 2010. DOI:10.1016/j.jhydrol.2009.06.026 <http://www.sciencedirect.com/science/article/pii/S0022169409003576#>
- UNISDR (2004). Chapter 2 Risk Awareness and Living with Risk. A global review of disaster reduction initiatives 2004 version Inter-Agency Secretariat of the International Strategy for Disaster Reduction (UN/ISDR). Subchapter 2.1 and 2.2 (partly): p. 35-52. http://www.unisdr.org/files/657_lwr1.pdf
- Merz, B., Hall, J., Disse, M. & Schumann, A. (2010). Fluvial flood risk management in a changing world. *Natural Hazards and Earth System Sciences*, 10: 509-527. <http://www.nat-hazards-earth-syst-sci.net/10/509/2010/nhess-10-509-2010.pdf>
- Olmstead, S.M. (2010). The economics of managing scarce water resources. *Review of Environmental Economics and Policy*, Volume 4(2), summer 2010, pp. 179-198. doi:10.1093/reqp/req004. <http://reep.oxfordjournals.org/content/4/2/179.full.pdf+html>
- Olmstead, S.M. (2010). The economics of water quality. *Review of Environmental Economics and Policy*, Volume 4(1), winter 2010, pp. 44-62. doi:10.1093/reqp/rep016. <http://reep.oxfordjournals.org/content/4/1/44.full.pdf+html>

Doelgroep

MSc students Environment and Resource Management (ERM) and Earth Sciences and Economics.(ESE).

Workshop Governance for Sustainable Development

Vakcode	AM_468026 ()
Credits	7.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	prof. dr. F.H.B. Biermann
Lesmethode(n)	Werkcollege