



Physics MSc

Vrije Universiteit Amsterdam - Faculteit der Exacte Wetenschappen - M Physics - 2013-2014

Structure of the training

In the Master curriculum knowledge of physics in general and in one or more specific areas of physics is deepened. The global structure is:

Part	O	M,C,E
Courses within specialisation	36	24
Seminar, literature study or project	6	
Research project	54	30
Presentation and Master thesis	6	6
Optional, deficiencies	12	
M, C, E courses or academic skills	6	60
Total	120	120

The programme includes compulsory courses for the chosen specialisation and optional courses that can be chosen from a list. In some specializations there are no optional courses in the M.C ,E-variants.

Furthermore, a student in the research variant can participate in a project or student seminar or can write an essay on a subject not directly related to his field of specialisation. 12 cp can be freely chosen within the university from courses on a 2nd or higher year level.

Research variant

The research variant is meant for students who want to pursue a research career. Students who have chosen to follow this variant will spend most of their time on courses and on their research project, including the Master's thesis in the chosen specialisation. Generally spoken these students may aim at continuing their study with PhD education, in order to obtain an executive job as researcher, group leader, at a university, research institution, government or (industrial) company.

The possible specialisations (research variants) are:

- Particle and Astroparticle Physics
- Theoretical Physics
- Advanced Matter and Energy Physics
- Laser Sciences and Biomolecular Photonics
- Physics of Life and Health

All programmes are together with the UvA. In some specialisations there is also cooperation with Chemistry and with the section Physics and Medical Technology of the VU medical centre.

M, C en E variant

Furthermore, a choice can be made out of three study variants.

- Communication variant (C-variant)
- Education variant (E-variant)

- Society oriented variant (M-variant)

For students wishing to combine a sound background in physics with applications or management in industry or business, the study variant Physics and Business (M) is offered. In the same spirit the Communication and Education programme lines prepare for careers in, e.g., science policy, scientific reporting and publishing, and science education in various settings (schools, museums, educational software). Apart from coursework the curriculum for the Business and Communication and Education lines also includes an internship outside the university, e.g., in a company, government agency, school or museum.

Deficiencies

The examination committee can require that a student follows courses from the Bachelor programme Physics in order to make up for deficiencies, up to a maximum of 12 cp.

Students following the O variant are required to spend 6 cp on an M/C/E subject, or on academic skills, so as to broaden their education. Students who have chosen an M, C or E variant can spend a maximum of 60 cp on subjects within that study variant.

[To master co-ordinators](#)

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Specialization Science, Business & Innovation

The MSc-SBI program outlined below features two thematic lines: (1) life science, with an emphasis on drug development, molecular diagnostics and innovative medical instrumentation, and (2) energy science, with an emphasis on sustainable energy development. This program, combining the natural sciences with innovation skill sets from a business and organizational perspective is spread across a two-year MSc-program. The program is full time and taught in English. To obtain an MSc degree in SBI, students must earn 120 credits (EC) in courses according to the scheme below.

1. Natural sciences 36 EC

a. Science courses 12 EC

b. Science project (incl literature research and research skills)
24 EC

2. Business and Social sciences 24 EC

3. Science, Business and Innovation 42 EC

a. SBI course 6 EC

b. SBI project (internship and master thesis) 36 EC

4. Complementary and/or electives 18 EC

In this program, students will be exposed to mandatory science classes, i.e. life science and/or energy science, to strengthen their background in natural sciences fundamentals. In addition, depending on the background of the students (either SBI BSc or other Bachelor degreed) there will be possibilities to define an appropriate customized MSc program. The chosen core will be complemented with a science project (24 EC) for specialization in an area of interest, in either Life or Energy science and with 24 EC in social and business sciences. The courses in social and business sciences focus on the processes and organizational context of innovation trajectories in business, industry and on institutional settings of inventions in life science and energy science and sustainability. The MSc-SBI is finalized through a final SBI-project of 36 EC (usually an internship at a company or institute) integrating the science, business and social aspects, leading to a Master's Thesis.

Opleidingsdelen:

- [Compulsory Choice of 24 EC science Project](#)
- [Compulsory Choice 1 out of 2](#)
- [Compulsory Choice of 12 ec](#)
- [Compulsory Courses](#)

Compulsory Choice of 24 EC science Project

Vakken:

Naam	Periode	Credits	Code
Science Project Energy	Ac. Jaar (september)	24.0	X_432736

Compulsory Choice 1 out of 2

Vakken:

Naam	Periode	Credits	Code
Business, Innovation and Value Creation in the Life Science Industry	Periode 3	6.0	X_432723
Current Sustainable Energy Technologies	Periode 3	6.0	X_422582

Compulsory Choice of 12 ec

Compulsory Choice of 12 ects from 1 of the following Science courses:

Vakken:

Naam	Periode	Credits	Code
Biomedical Modelling and Simulation	Periode 1	6.0	X_430112
BioSolar Cells	Periode 1	6.0	X_428531
Chemical Biology	Periode 1	6.0	X_432538
Green Chemistry	Periode 1	6.0	X_430557
Innovation in Medical Technology to Improve the Health Care System	Periode 6	6.0	X_430602
Modelling and Simulation for Life Sciences	Periode 4	6.0	X_432732
Photovoltaics	Periode 2	6.0	X_428516
Principles of Pharmaceutical Sciences / Pharmacology	Periode 1	6.0	X_435675
Project Sustainable Future	Periode 6	6.0	X_432784

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Expertise and coördination in Knowledge Intensive Firms	Periode 1	6.0	X_432738
Management of Sustainable Innovation	Periode 2	6.0	X_432739
Networked Organizations and Communication	Periode 2	6.0	S_NOC
SBI Project & Master Thesis	Ac. Jaar (september)	36.0	X_432735

Transdisciplinarity and Transition	Periode 2	6.0	X_430604
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Specialization Science for Energy and Sustainability

Opleidingsdelen:

- Compulsory Choice of at least 24 ec.
- Compulsory Choice Ethics and Portfolio Academic skills
- Compulsory Courses

Compulsory Choice of at least 24 ec.

Vakken:

Naam	Periode	Credits	Code
Big Issues in Energy Materials	Periode 1	3.0	X_422535
BioSolar Cells	Periode 1	6.0	X_428531
Catalysis for sustainable energy	Periode 4	6.0	X_437027
Environmental Chemistry	Periode 1	6.0	X_437004
Green Chemistry	Periode 1	6.0	X_430557
Heterogeneous Catalysis	Periode 3	6.0	X_428013
Homogeneous Catalysis	Periode 5	6.0	X_435668
Management of Sustainable Innovation	Periode 2	6.0	X_432739
Nuclear Fuels	Periode 4	6.0	X_432787
Photosynthesis and Energy	Periode 5	6.0	X_422553
Photovoltaics	Periode 2	6.0	X_428516

Compulsory Choice Ethics and Portfolio Academic skills

Compulsory choice of at least 6 ec

Vakken:

Naam	Periode	Credits	Code
Communication, Organization and Management	Periode 2	6.0	AM_470572
English Academic Course	Periode 2+3, Periode 5+6	3.0	X_437028
Managing Science and Technology in Society	Periode 1	6.0	AM_470586
Qualitative and Quantitative Research Methods	Periode 1	6.0	AM_470582

Science and Communication	Periode 1	6.0	AM_470587
Science in Dialogue	Periode 2	6.0	AM_1002
Science in Perspective	Periode 4+5	6.0	X_437030
Scientific Writing in English	Periode 2, Periode 6	3.0	X_400592
Survival Guide for Scientists	Periode 6	3.0	X_428523
Tutoring Students	Periode 2	3.0	X_432625
Wetenschapscommunicatie voor Bèta-onderzoekers	Periode 5	6.0	AB_470185

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Current Sustainable Energy Technologies	Periode 3	6.0	X_422582
Literature Thesis SES	Ac. Jaar (september)	12.0	X_432785
Project Sustainable Future	Periode 6	6.0	X_432784

Communication variant

This specialization is intended for students with a BSc degree in any of the bèta-studies who want to specialize in communication. The programme focuses on science communication theory, research and practice. The programme of the communication (C) specialization is 1 year (60 credits). This specialization may not be combined with the Societal specialization (M) or the Education specialization (E). C-courses are shared with master students from the Faculty of Earth and Life Sciences.

Programme

For a specialization degree it is required to spend 60 credits on Science Communication components. Two courses, one internship and a thesis are compulsory. The rest of the programme can be filled with optional courses. While science communication research is always a component of a students' internship, students have the opportunity to choose for placement at institutes such as newspapers, museums, science centers, companies, etc. to hone their practical as well as academic skills. Students' thesis comprise short (9 credits) literature studies on research questions about aspects of science communication.

To complete his or her entire Master programme (120 credits), the student has to choose 60 credits Physics courses.

Before formal enrolment, the students' programme has to be approved by the master coordinator as well as the programme coordinator for the Science Communication.

Opleidingsdelen:

- [Courses for Communication Part](#)

Courses for Communication Part

To complete the Master programme (120 credits) of the Communication Variant, the student has to choose 60 credits Communication courses.

Opleidingsdelen:

- [MSc Biology, Communication Specialisation](#)

MSc Biology, Communication Specialisation

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

Opleidingsdelen:

- [Internship Science Communication](#)
- [Course modules Communication spec.](#)

Internship Science Communication

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

Vakken:

Naam	Periode	Credits	Code
Internship Communication Specialisation	Ac. Jaar (september)	30.0	AM_471148

Course modules Communication spec.

Students can opt for a selection of modules from this group. The following modules are compulsory:

- Research Methods (AM_470582)
- Science and Communication (AM_470587)

Vakken:

Naam	Periode	Credits	Code
Communication, Organization and Management	Periode 2	6.0	AM_470572
Qualitative and Quantitative Research Methods	Periode 1	6.0	AM_470582
Science and Communication	Periode 1	6.0	AM_470587
Science in Dialogue	Periode 2	6.0	AM_1002
Science Journalism	Periode 2	6.0	AM_471014
Science Museology	Periode 3	6.0	AM_470590

Educatie variant

The teaching in these variant is mainly in Dutch. Therefore we also give the requirements in Dutch.

Programma

De opleiding voor het behalen van de eerstegraads lesbevoegdheid start twee keer per jaar, in september en in februari. De opleiding wordt aangeboden in twee semesters. Uitgaande van de start in september duurt semester 1 tot en met januari en semester 2 tot juli. De opleiding is sterk praktijkgericht. De helft van de opleiding bestaat uit praktijk door werkervaring of stage (ook wel schoolpracticum genoemd) op een school voor voortgezet onderwijs. Daarnaast kent de opleiding vier componenten: vakdidactiek, algemene didactiek/pedagogiek, praktijkonderzoek en verdiepingsmodulen.

Naast de educatievakken volgt de student 60 sp Physics vakken, in overleg met de mastercoördinator van de gekozen specialisatie. Hierbij zijn de twee vakken Literature thesis and Colloquium Physics Education Variant en Master Research Project Physics-Education Variant verplicht.

Studenten die bij de Communicatie variant de vakken 'interpersoonlijke communicatie' en 'museologie en buitenschoolse educatie' volgen, krijgen bij de lerarenopleiding een vrijstelling voor verdiepingsmodulen, een deel van het praktijkonderzoek en een deel van algemene didactiek.

Opleidingsdelen:

- [Recommended elective Course](#)
- [Courses for Education Part](#)

Recommended elective Course

Compulsory courses at the expense of the optional courses unless the content already is covered in the bachelor programme.

Note: Every programme, including the choice of optional courses, has to be discussed and agreed upon with the master coordinator or a personal mentor and approved by the Examination Board.

Vakken:

Naam	Periode	Credits	Code
Speciale Relativiteitstheorie	Ac. Jaar (september)	1.0	X_422534

Courses for Education Part

To complete the Master programme (120 credits) of the Education Variant, the student has to choose 60 credits Education courses.

Opleidingsdelen:

- [Leraar voorbereidend hoger onderwijs in Natuurkunde verplicht](#)

Leraar voorbereidend hoger onderwijs in Natuurkunde verplicht

Vakken:

Naam	Periode	Credits	Code
Algemene didactiek en Pedagogiek I	Semester 1, Semester 2	6.0	O_MLADEPI
Algemene Didactiek en Pedagogiek II	Semester 1, Semester 2	3.0	O_MLADEPII
Praktijk I	Semester 1, Semester 2	15.0	O_MLPRAKI
Praktijk II	Semester 1, Semester 2	15.0	O_MLPRAKII
Professionele ontwikkeling en onderzoek I	Semester 1, Semester 2	3.0	O_MLVPOOI
Professionele ontwikkeling en onderzoek II	Semester 1, Semester 2	6.0	O_MLVPOOII
Vakdidactiek Natuurkunde I	Semester 1, Semester 2	3.0	O_MLVDNAI
Vakdidactiek Natuurkunde II	Semester 1, Semester 2	6.0	O_MLVDNAII
Verdieping	Semester 1, Semester 2	3.0	O_MLVERD

Research Variant Particle Physics and Astroparticle Physics

What are the smallest building blocks ("particles") of the universe? Via which forces do these particles interact? Can one understand the apparently random particle masses? Why do we live in a matter (as opposed to anti-matter) dominated universe? These and many other questions are the context of experiments and theoretical work in (astro) particle physics. In particle accelerator experiments physicists investigate high energy interactions in a controlled environment that is thought to approach the conditions in the universe at a fraction of a second after the Big Bang. In non-accelerator experiments the physicists study the neutrino radiation from the sun, supernova and other speculative sources. Common features of the experiments in this field of physics are the state-of-the-art technology and innovative software (like distributed computing with the GRID-project).

More Information: <http://master.particles.nl/> .

The programme consists of 120 credits

- compulsory courses 78 credits (including a Master Project of 54 credits and a Colloquium and thesis report of 6 credits about the Master Project)
- compulsory optional choice 24 credits from a list
- optional courses 12 credits (free to choose)
- at least 6 credits Management, Communication or Education courses or academic skills

Note: Every programme, including the choice of optional courses, has to be discussed and agreed upon with the master coordinator or a personal mentor and approved by the Examination Board.

Details about research in this master track can be found here

http://www.nat.vu.nl/en/research/astro_particle_physics/index.asp

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Opleidingsdelen:

- [Optional courses \(24 ec compulsory\)](#)
- [M, C, E Courses or academic Skills \(6 ec\)](#)
- [Compulsory Courses](#)

Optional courses (24 ec compulsory)

Students need to select a total of 24 credits or more from the following list.

Note: Every programme, including the choice of optional courses, has to be discussed and agreed upon with the master coordinator or a personal mentor and approved by the Examination Board.

Vakken:

Naam	Periode	Credits	Code
Astroparticle Physics	Periode 4	6.0	X_420005
Beyond the Standard Model	Periode 4+5+6	3.0	X_420192
CERN Research Project	Periode 4+5+6	6.0	X_420116
CERN Summer Student Lecture Programme	Periode 4+5+6	3.0	X_420122
Computational Methods	Periode 4	6.0	X_420014

Flavour Physics and CP Violation	Periode 4	3.0	X_428539
General Relativity	Semester 1	6.0	X_420128
Gravitational Waves (Selected Topics in Gravitation and Cosmology)	Semester 2	3.0	X_428506
Group Theory	Periode 1	6.0	X_420025
Particle Cosmology	Periode 4+5+6	6.0	X_420560
Particle Detection	Semester 2	6.0	X_420051
Particles and Fields	Periode 4+5	6.0	X_420112
Physics of Anti-matter	Semester 2	3.0	X_428505
Programming C++	Periode 3	3.0	X_420141
Quantum Field Theory	Periode 2	6.0	X_420081
Statistical Data Analysis	Periode 1	6.0	X_420067
Strong Interactions 1	Periode 4	3.0	X_420233
Strong Interactions 2	Periode 5	3.0	X_420234

M, C, E Courses or academic Skills (6 ec)

Students need to select at least 6 credits from the following list or a M, C, E course from the range of the M, C and E variants

Note: Every programme, including the choice of optional courses, has to be discussed and agreed upon with the master coordinator or a personal mentor and approved by the Examination Board.

Vakken:

Naam	Periode	Credits	Code
Scientific Writing in English	Periode 2, Periode 6	3.0	X_400592
Survival Guide for Scientists	Periode 6	3.0	X_428523

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Colloquium en afstudeerverslag - Particle Physics and Astroparticle Physics	Ac. Jaar (september)	6.0	X_422520
Master Project Particle Physics and Astroparticle Physics	Ac. Jaar (september)	54.0	X_422512
NIKHEF Project	Periode 4+5+6	6.0	X_420115
Particle Physics I	Periode 1	6.0	X_420052

Particle Physics II	Periode 2	6.0	X_420053
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Research Variant Theoretical Physics

The programme consists of 120 credits

- compulsory courses 78 credits (including a Master Project of 54 credits and a Colloquium and thesis report of 6 credits about the Master Project)
- compulsory optional choice 24 credits from a list
- optional courses 12 credits (free to choose)
- at least 6 credits Management, Communication or Education courses or academic skills

Note: Every programme, including the choice of optional courses, has to be discussed and agreed upon with the master coordinator or a personal mentor and approved by the Examination Board.

Details about research in this master track can be found here
<http://tinyurl.com/qyk5n6g>

Master coordinators

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Opleidingsdelen:

- [M, C, E Courses or academic Skills \(6 ec\)](#)
- [Optional courses \(24 ec compulsory\)](#)
- [Recommended elective courses](#)
- [Compulsory Courses](#)

M, C, E Courses or academic Skills (6 ec)

Students need to select at least 6 credits from the following list or a M, C, E course from the range of the M, C and E variants

Note: Every programme, including the choice of optional courses, has to be discussed and agreed upon with the master coordinator or a personal mentor and approved by the Examination Board.

Vakken:

Naam	Periode	Credits	Code
Scientific Writing in English	Periode 2, Periode 6	3.0	X_400592
Survival Guide for Scientists	Periode 6	3.0	X_428523

Optional courses (24 ec compulsory)

Students need to select a total of 24 credits or more from the following list.

Note: Every programme, including the choice of optional courses, has to be discussed and agreed upon with the master coordinator or a personal mentor and approved by the Examination Board.

Vakken:

Naam	Periode	Credits	Code
Beyond the Standard Model	Periode 4+5+6	3.0	X_420192
Computational Methods	Periode 4	6.0	X_420014
Flavour Physics and CP Violation	Periode 4	3.0	X_428539
General Relativity	Semester 1	6.0	X_420128
Group Theory	Periode 1	6.0	X_420025
Particle Cosmology	Periode 4+5+6	6.0	X_420560
Particles and Fields	Periode 4+5	6.0	X_420112
Quantum Field Theory - Extension	Periode 3	3.0	X_422554
Statistical Physics and Condensed Matter Theory II	Semester 2	6.0	X_420100
Statistical Physics and Condensed Matter Theory II - Extension	Periode 3	3.0	X_428519
String Theory	Semester 1	6.0	X_400242

Recommended elective courses

Compulsory courses at the expense of the optional courses unless the content has already been covered in the bachelor programme.

Note: Every programme, including the choice of optional courses, has to be discussed and agreed upon with the master coordinator or a personal mentor and approved by the Examination Board.

Vakken:

Naam	Periode	Credits	Code
Advanced Quantum Mechanics	Periode 1	6.0	X_420003
Mathematische methoden	Periode 4	6.0	X_420105

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Colloquium en afstudeerverslag - Theoretical Physics	Ac. Jaar (september)	6.0	X_422519
Master Project Theoretical Physics	Ac. Jaar (september)	54.0	X_422509
Quantum Field Theory	Periode 2	6.0	X_420081
Statistical Physics and Condensed Matter Theory I	Periode 1	6.0	X_420083
Student Seminar Theoretical Physics	Semester 2	6.0	X_420200

Research Variant Advanced Matter and Energy Physics

The programme consists of 120 credits

- compulsory courses 24 credits (including a Colloquium and thesis report of 6 credits about the Master Project)
- compulsory master project 30 - 54 credits
- compulsory minor project if master project [Missing ITEM:] (the sum of the Master project and Minor project must be at least 54 credits)
- compulsory choice of 24 credits from a list
- optional courses 12 credits (free to choose)
- at least 6 credits Management, Communication or Education courses or academic skills. The compulsory course Survival Guide for scientists (3 ec) is part of this

Note: Every programme, including the choice of optional courses, has to be discussed and agreed upon with the master coordinator or a personal mentor and approved by the Examination Board.

Details about research in this master track can be found here
<http://www.nat.vu.nl/en/research/condensed-matter-physics/index.asp>

Master coordinator

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Opleidingsdelen:

- [Compulsory Choice Master Project](#)
- [Compulsory Choice Minor Project](#)
- [Optional courses \(24 ec compulsory\)](#)
- [Compulsory Courses](#)

Compulsory Choice Master Project

Students need to select one of the courses from the following list.

The sum of the Master project and Minor project must be at least 54 credits.

Note: Every programme, including the choice of optional courses, has to be discussed and agreed upon with the master coordinator or a personal mentor and approved by the Examination Board.

Vakken:

Naam	Periode	Credits	Code
Master Project Physics: AMEP	Ac. Jaar (september)	48.0	X_422563
Master Project Physics: AMEP	Ac. Jaar (september)	30.0	X_422560
Master Project Physics: AMEP	Ac. Jaar (september)	36.0	X_422561
Master Project Physics: AMEP	Ac. Jaar (september)	42.0	X_422562
Master Project Physics: AMEP	Ac. Jaar (september)	54.0	X_422564

Compulsory Choice Minor Project

Students need to select one of the courses from the following list if the Master Project is [Missing ITEM:]

The sum of the Master project and Minor project must be at least 54 credits.

Note: Every programme, including the choice of optional courses, has to be discussed and agreed upon with the master coordinator or a personal mentor and approved by the Examination Board.

Vakken:

Naam	Periode	Credits	Code
Minor Project Physics: AMEP	Ac. Jaar (september)	6.0	X_422572
Minor Project Physics: AMEP	Ac. Jaar (september)	12.0	X_422573
Minor Project Physics: AMEP	Ac. Jaar (september)	18.0	X_422574
Minor Project Physics: AMEP	Ac. Jaar (september)	24.0	X_422575

Optional courses (24 ec compulsory)

Students need to select a total of 24 credits or more from the following list.

Note: Every programme, including the choice of optional courses, has to be discussed and agreed upon with the master coordinator or a personal mentor and approved by the Examination Board.

Vakken:

Naam	Periode	Credits	Code
Classical and quantum Chaos	Semester 2	6.0	X_428534
Fermi Quantum Gases	Semester 2	6.0	X_428514
Forensics with complex liquids	Semester 2	3.0	X_428538
Hydrodynamics	Semester 2	6.0	X_428536
Mathematica for physicists	Periode 3	3.0	X_428533
Nanophotonics	Semester 2	6.0	X_428537
Photosynthesis and Energy	Periode 5	6.0	X_422553
Photovoltaics	Periode 2	6.0	X_428516
Programming C++	Periode 3	3.0	X_420141
Quantum optics	Periode 4	6.0	X_428535
Soft Condensed Matter and Biological Physics	Periode 2	6.0	X_420167
Statistical Mechanics of Soft Matter	Periode 1	6.0	X_422555
Statistical Physics and Condensed Matter Theory I	Periode 1	6.0	X_420083
Summer-school AMEP	Semester 2	3.0	X_428521
Superconductivity	Periode 4	6.0	X_428522
Ultrafast Laser Physics	Periode 5	6.0	X_422556
Ultrafast X-ray Physics	Semester 2	3.0	X_428524

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Big Issues in Atomic Quantum Physics	Semester 2	3.0	X_428508
Big Issues in Emergent Energy Materials	Periode 1	6.0	X_422587
Big Issues in Soft Matter	Periode 4	3.0	X_428509
Colloquium and Literature Thesis	Ac. Jaar (september)	6.0	X_422536
Oriëntation Project	Periode 3, Periode 5	6.0	X_422580
Scientific Writing in English	Periode 2, Periode 6	3.0	X_400592
Survival Guide for Scientists	Periode 6	3.0	X_428523

Research Variant Physics of Life and Health

The programme consists of 120 credits

- compulsory courses 12 credits (including a Colloquium and thesis report of 6 credits about the Master Project)
- compulsory master project 30 - 54 credits
- compulsory minor project if master project [Missing ITEM:]
(the sum of the Master project and Minor project must be at least 54 credits)
- compulsory optional choice 12 credits
- compulsory optional choice 24 credits
- compulsory optional courses 12 credits (free to choose)
- at least 6 credits Management, Communication or Education courses or academic skills.

Note: Every programme, including the choice of optional courses, has to be discussed and agreed upon with the master coordinator or a personal mentor and approved by the Examination Board.

Details about research in this master track can be found here:

<http://www.nat.vu.nl/en/research/physics-life-health/index.asp>

(link to the Physics of Life group)

<http://tinyurl.com/qzz9uun>

(link to Biophysics and Medical Imaging)

Master coordinators

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Opleidingsdelen:

- [Compulsory Choice Master Project](#)
- [Compulsory Choice Minor Project](#)
- [Optional courses \(12 ec compulsory\)](#)
- [Optional courses \(24 ec compulsory\)](#)
- [M, C, E courses or academic skills \(6 ec\)](#)
- [Compulsory Courses](#)

Compulsory Choice Master Project

Students need to select one of the courses from the following list.

The sum of the Master project and Minor project must be at least 54 credits.

Note: Every programme, including the choice of optional courses, has to be discussed and agreed upon with the master coordinator or a personal mentor and approved by the Examination Board.

Vakken:

Naam	Periode	Credits	Code
Master Project Physics: PLH	Ac. Jaar (september)	36.0	X_422541
Master Project Physics: PLH	Ac. Jaar (september)	30.0	X_422540

Master Project Physics: PLH	Ac. Jaar (september)	42.0	X_422542
Master Project Physics: PLH	Ac. Jaar (september)	48.0	X_422543
Master Project Physics: PLH	Ac. Jaar (september)	54.0	X_422544

Compulsory Choice Minor Project

Students need to select one of the courses from the following list if the Master Project is less than 54 credits.

The sum of the Master project and Minor project must be at least 54 credits.

Note: Every programme, including the choice of optional courses, has to be discussed and agreed upon with the master coordinator or a personal mentor and approved by the Examination Board.

Vakken:

Naam	Periode	Credits	Code
Minor Project Physics: PLH	Ac. Jaar (september)	6.0	X_422548
Minor Project Physics: PLH	Ac. Jaar (september)	12.0	X_422549
Minor Project Physics: PLH	Ac. Jaar (september)	18.0	X_422550
Minor Project Physics: PLH	Ac. Jaar (september)	24.0	X_422551

Optional courses (12 ec compulsory)

Students need to select a total of 12 credits or more from the following list.

Note: Every programme, including the choice of optional courses, has to be discussed and agreed upon with the master coordinator or a personal mentor and approved by the Examination Board.

Vakken:

Naam	Periode	Credits	Code
Biomedical Optics	Periode 4	6.0	X_428529
Physics of Organs 1: Cardio-Pulmonary Physics	Periode 1	6.0	X_428527
Soft Condensed Matter and Biological Physics	Periode 2	6.0	X_420167
Statistical Mechanics of Soft Matter	Periode 1	6.0	X_422555

Optional courses (24 ec compulsory)

Students need to select a total of 24 credits or more from the following list.

Note: Every programme, including the choice of optional courses, has to

be discussed and agreed upon with the master coordinator or a personal mentor and approved by the Examination Board.

Vakken:

Naam	Periode	Credits	Code
Advanced Medical Technology	Periode 5	6.0	X_437026
Biomedical Modelling and Simulation	Periode 1	6.0	X_430112
Biophotonics III: Practical Training	Periode 3	3.0	AM_470630
Dynamics of Biomolecules and Cells	Periode 4	6.0	X_422583
From Genome to Physiome	Semester 2	6.0	X_420127
Introductie Medische Beeldbewerking	Periode 2	6.0	X_432630
Lasers and Quantum Optics	Periode 1	6.0	X_422539
Medical Imaging	Periode 5	6.0	X_428526
Parameter Estimation Applied to Medical and Biological Sciences	Periode 4	6.0	X_432631
Photosynthesis and Energy	Periode 5	6.0	X_422553
Physics of Organs 2: Sensory Organs and Bioelectricity	Semester 1	6.0	X_428528
Statistical Theory of Complex Molecular Systems	Periode 1	6.0	X_428520

M, C, E courses or academic skills (6 ec)

Compulsory optional choice of 6 ec from the following list or a M, C, E course from the range of the M, C and E variants.

At most one of the Ethics courses can be chosen

Vakken:

Naam	Periode	Credits	Code
Ethics in Life Sciences	Periode 3	3.0	AM_470707
Ethics in Public Health	Ac. Jaar (september), Periode 3	3.0	AM_470805
Scientific Writing in English	Periode 2, Periode 6	3.0	X_400592
Survival Guide for Scientists	Periode 6	3.0	X_428523

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Colloquium and Literature Thesis	Ac. Jaar (september)	6.0	X_422538
Literature Study mPhys-PLH	Ac. Jaar (september)	6.0	X_422585

Society Oriented Variant for Natural and Life Sciences

Due to the growing complexity of technological and medical issues and the interaction with society, organisations working in this sector have a growing and urgent need for academic professionals in the natural and life sciences, who have knowledge of policy management and entrepreneurship. The Society oriented variant offers students with a bachelor degree in the natural and life sciences the chance to combine a specialization in this field with a specialization in research.

Programme

The programme of the Society oriented variant is equal to the first year of the master programme Management Policy- Analysis and entrepreneurship (MPA). The programme of the Society oriented variant consists of 60 cp (18 cp compulsory courses; 12 cp optional courses and 30 cp internship) The course language is English, unless all students participating in the course speak Dutch, the course language will be Dutch.

Apart from the communication courses, the student has to choose 60 sp Physics courses. The student has to discuss the programme with the master coordinator of the chosen specialisation.

Opleidingsdelen:

- [Courses for Society Oriented Part](#)

Courses for Society Oriented Part

To complete the Master programme (120 credits) of the Society Oriented Variant, the student has to choose 60 credits Society Oriented courses.

Opleidingsdelen:

- [MSc Biology, Societal specialisation](#)

MSc Biology, Societal specialisation

Courses:

Name	Period	Credits	Code
Analysis of Governmental Policy	Period 1	6.0	AM_470571
Business Management in Health and Life Sciences	Period 2	6.0	AM_470584
Clinical development and clinical trials	Period 3	6.0	AM_470585

Communication, Organization and Management	Period 2	6.0	AM_470572
Disability and Development	Period 2	6.0	AM_470588
Entrepreneurship in Health and Life Sciences	Period 2	6.0	AM_470575
Health, Globalisation and Human Rights	Period 2	6.0	AM_470818
Internship Societal Specialisation	Ac. Year (September)	30.0	AM_471147
Policy, Politics and Participation	Period 2	6.0	AM_470589
Qualitative and Quantitative Research Methods	Period 1	6.0	AM_470582
Science in Dialogue	Period 2	6.0	AM_1002

Advanced Medical Technology

Vakcode	X_437026 (437026)
Periode	Periode 5
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. ir. R.M. Verdaasdonk
Docent(en)	prof. dr. ir. R.M. Verdaasdonk
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak

Understanding the physical principles of medical equipment in view of a safe and effective application.

Inhoud vak

The course consists of an overview of various medical devices discussing the physical principles and mechanism of action when used with a patient. The understanding of the physics contributes to the safety of the patient and the way the device can be applied most optimally. Particular devices will be discussed like electro-surgery, lasers, ultrasonic knives, endoscopes, etc. Also recent research and new developments of instruments will be shown.

Onderwijsvorm

Combination of lectures, practical hands-on with medical equipment, short projects of practical and literature research, oral project presentations.

Overige informatie

Students should also register in advance for this course on Blackboard.

Advanced Quantum Mechanics

Vakcode	X_420003 (420003)
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Periode	Periode 1
Credits	6.0
Voertaal	Nederlands
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. P.J.G. Mulders
Docent(en)	prof. dr. P.J.G. Mulders
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	300

Doel vak

To further develop skills in performing quantum mechanical calculations and study applications in various fields.

Inhoud vak

- Symmetries in quantum mechanics: time and space translations, rotations, boosts (nonrelativistic) and applications (Bloch theorem,...)
- Angular momentum: orbital angular momentum and spin; addition of angular momenta, Clebsch-Gordan coefficients; tensor operators, Wigner-Eckart theorem and applications (hyperfine structure, Zeeman splitting, ...)
- Identical particles: spin and statistics, permutation symmetry and applications in two-electron and many-electron atoms (Hartree and Hartree-Fock methods, ...)
- Time independent and time dependent perturbation theory; Rabi flopping, magnetic resonance; adiabatic and sudden approximation; Fermi's golden rule, radiation, spontaneous emission, line width
- Relativistic quantum mechanics: Klein-Gordon and Dirac equations; probability and currents, continuity equation, coupling to electromagnetic field; Pauli equation and applications to Hydrogen atom

Onderwijsvorm

Combined lectures and exercise sessions.

Toetsvorm

Oral or written exam (depending on the number of participants).

Literatuur

Griffiths, D.J., Introduction to Quantum Mechanics 2nd ed. Prentice Hall (ISBN 0131911759).

Bransden, B.H., and Joachain, C.J., Quantum Mechanics 2nd ed. Prentice Hall.

Aanbevolen voorkennis

Quantum Mechanics at level of Griffiths (Chapters 1 - 6). Relevant courses for this are Classical and Quantum Mechanics 1 and 2 (2N, 2-WN).

Doelgroep

3N, 3-WN

Algemene didactiek en Pedagogiek I

Vakcode	O_MLADEPI ()
Periode	Semester 1, Semester 2
Credits	6.0

Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek
Coördinator	ir. E.J.F. Scheringa
Docent(en)	drs. W.S. Hoekstra, drs. S. Donszelmann, drs. B. Klein, drs. W. Jongejan, C.L. Geraedts
Lesmethode(n)	Hoorcollege
Niveau	500

Doel vak

De student kan algemene onderwijskundige en pedagogische inzichten op het terrein van (activerende) didactiek (rol van ontwerper), communicatie in de klas (rol van uitvoerder) en gedrag- en leerproblemen (verdiepende module) vertalen naar de eigen lespraktijk.

Inhoud vak

Deze module kent 4 onderdelen:

- de startweek (1 erts), waarin de student kennis maakt met de opleiding, met het basisinstrumentarium van een docent en de eigen startcompetenties in kaart brengt;
- colleges ten aanzien van de rol van Ontwerper en de rol van Uitvoerder;
- colleges over gedrag- en leerproblemen, waarin problematiek en aanpak van meest gangbare gedrag- en leerproblemen aan bod komen.

Onderwijsvorm

Colleges (hoorcolleges en werkgroepen)

Toetsvorm

- beoordeling van het portfolio
- tentamen over de colleges gedrag- en leerproblemen

Literatuur

Een literatuurlijst wordt verstrekt aan het begin van de opleiding

Vereiste voorkennis

Dit vak is alleen te volgen als onderdeel van de universitaire lerarenopleiding

Overige informatie

Voor alle onderdelen (startweek, rollen, verdiepende module) geldt een aanwezigheidsplicht

Algemene Didactiek en Pedagogiek II

Vakcode	O_MLADEPII ()
Periode	Semester 1, Semester 2
Credits	3.0
Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek
Coördinator	drs. B. Klein
Docent(en)	drs. H.R. Goudsmit, drs. B. Klein, dr. T. Bosma
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	500

Doel vak

De student kan:

1. leerlingen, als individu en als lid van de groep, ondersteunen en stimuleren in hun verdere persoons- en identiteitsontwikkeling;
2. de voorbeeldfunctie ten opzichte van leerlingen vormgeven en daarop reflecteren;
3. leerlingen helpen bij de voorbereiding op hun rol in de samenleving als actief participierend burger;
4. deze en eerdere verworven competenties aantonen in een showcaseportfolio

Inhoud vak

Deze module kent 2 onderdelen:

- colleges ten aanzien van de rol van Pedagoog;
- het werken aan de rolopdachten voor de rol van uitvoerder, ontwerper en pedagoog voor het showcaseportfolio;

Onderwijsvorm

Colleges (hoorcolleges en werkgroepen) en zelfstudie

Toetsvorm

- een tentamen betreffende de rol van Pedagoog
- beoordeling van het showcase portfolio, waarin de student de verworven competenties ten aanzien van alle rollen aantoont

Literatuur

Een literatuurlijst wordt verstrekt aan het begin van de opleiding, en staat op Blackboard bij de betreffende studieonderdeel

Vereiste voorkennis

Dit vak is alleen te volgen als onderdeel van de universitaire lerarenopleiding

Overige informatie

Voor de colleges geldt een aanwezigheidsplicht. Studenten die dit vooraf met de vakdidacticus/mentor overeengekomen zijn, kunnen in zelfstudie onderdelen afronden.

Analysis of Governmental Policy

Vakcode	AM_470571 ()
Periode	Periode 1
Credits	6.0
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
Lesmethode(n)	Hoorcollege, Werkgroep, Computerpracticum
Niveau	500

Doel vak

- To acquire critical knowledge regarding different policy models and theories
- To master the correct use of central concepts in political and policy

discourses.

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

Inhoud vak

Governmental policy affects millions of people and is thus object of intensive debate and target of strong societal forces, like political parties, media and interest groups. Being an advisor or policy maker requires a thorough understanding of the dynamics of policy making, as well as from the psychological side as from the more social structures and their influence on a deliberative democracy.

The course contains several lectures on theoretical concepts and models concerning policy analysis. Furthermore you will be challenged, under supervision, to apply and practice these concepts and models in the project assignment. From the very first day, you will be part of a project team of about ten students. You are confronted with a real policy problem from an external commissioning institution (e. g. a non-governmental organization, a Ministry, an advisory council). Within those 4 weeks you will collect data by literature review and interviews and conduct an interdisciplinary analysis on the basis of which you provide an advice. Specific attention is paid to working in a project team and team building. At the end of the course, you prepare an advisory report. On the last day of the course you present the report to the representative of the external institution who commissioned the project. In that presentation your team will highlight the main results of your analysis and defend the recommendations you propose.

Onderwijsvorm

Analysis of Governmental Policy is a fulltime course of four weeks (6 ECTS). The most recent course schedule is to be found on Blackboard. The total study time is 160 hours. Tuition methods include lectures, training workshops, and self-study.

The different elements have the following study time:

- lectures: 15 hours
- project: 147 hours (within the project: 18x 1 hour coach meeting)
- self study: (within the project, defined in the group)
- examination: 2 hours

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

Toetsvorm

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

Literatuur

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

Aanbevolen voorkennis

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

Doelgroep

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

Overige informatie

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

Astroparticle Physics

Vakcode	X_420005 (420005)
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H.J. Bulten
Niveau	400

Inhoud vak

The course description is; available on <http://studiegids.uva.nl/web/uva/sgs/en/c/131.html>

Doelgroep

mPhys

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

UvA-coordinator: prof.dr. P.M. Kooijman.

Beyond the Standard Model

Vakcode	X_420192 (420192)
Periode	Periode 4+5+6
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	500

Inhoud vak

The course description is available on
http://studiegids.uva.nl/web/uva/2012_2013/nl/c/9640.html

Overige informatie

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Big Issues in Atomic Quantum Physics

Vakcode	X_428508 ()
Periode	Semester 2
Credits	3.0
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

The course description is; available on
<http://studiegids.uva.nl/web/uva/sgs/nl/c/14304.html>

Overige informatie

Overige info
Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Big Issues in Emergent Energy Materials

Vakcode	X_422587 ()
Periode	Periode 1
Credits	6.0
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Doel vak

The aim of this course is to acquaint the students with the physics underlying the topical research into emergent energy materials taking place in Amsterdam laboratories. Emergent energy materials are solid state materials systems under development for use in the sustainable generation or conversion of energy and systems under discussion as a materials platform for future energy-saving, low-power electronics and spintronics.

The course is a success if, on the one hand, the students are able to make links from standard BSc lecture material in solid state physics - such as semiconductor physics - to the cutting edge research being carried out in the following three themes, each of which will be treated as a module within the BI-EEM course:

- silicon-based nanophotovoltaics
- inorganic materials for hydrolysis (water-splitting) using sunlight

- topological insulators

On the other hand, the course also aims to provide the participants with a grounding in the current research state-of-the-art in these fields, and to introduce the student to the relevant primary scientific literature, its discussion and critique.

Inhoud vak

The course comprises three blocks, matching each of the thematic modules introduced above.

- Si-based nanophotovoltaics

For very fundamental reasons – natural abundance, nontoxicity, suitable band structure – silicon is presently the most important photovoltaic material. New opportunities are offered by dedicated material engineering of Si nanostructures.

- Inorganic materials for solar water splitting

Most renewable energy sources are intermittent. Storage of energy in fuels is therefore important. Inorganic semiconductor nano-crystals when exposed to sunlight are able to split water into hydrogen and oxygen.

- Topological insulators (TI's)

In topological insulators, strong spin-orbit coupling gives the bands of a semiconductor a special twist, thus forming spin-polarized, topologically protected metallic surface states. TI's are proposed as a platform for future low-power spintronics technology.

Onderwijsvorm

Introductory lectures for each module (with homework). Workshop-style student presentations dealing with research articles.

Toetsvorm

Examination: Student-presentations during the lectures

Literatuur

Will be announced during the lectures

Doelgroep

MPhysics

Intekenprocedure

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Overige informatie

Coordinator: T. Gregorkiewicz (UVA)

1e Beoordelaar: R.J. Wijngaarden (VU)

2e beoordelaar: M. Golden (UVA)

Big Issues in Energy Materials

Vakcode	X_422535 (422535)
Periode	Periode 1
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen

Coördinator	dr. R.J. Wijngaarden
Niveau	400

Inhoud vak

<http://studiegids.uva.nl/web/uva/sgs/nl/c/11037.html>

Doelgroep

mPhys, mChem, mCh-SES

Overige informatie

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

Big Issues in Soft Matter

Vakcode	X_428509 (428509)
Periode	Periode 4
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege
Niveau	400

Inhoud vak

The course description is; available on

<http://studiegids.uva.nl/web/uva/sgs/en/c/11060.html>

Doelgroep

mPhys-TP, mPhys-AMEP

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Biomedical Modelling and Simulation

Vakcode	X_430112 (430112)
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. I.H.M. van Stokkum
Docent(en)	dr. I.H.M. van Stokkum, prof. dr. G.J.M. Stienen, dr. ir. T.J.C. Faes, dr. J.C. de Munck
Lesmethode(n)	Hoorcollege, Werkcollege, Practicum, Werkgroep
Niveau	400

Doel vak

To gain knowledge of the most important theoretical and practical concepts in modelling and simulation of biomedical processes at different scales, ranging from macroscopic organ function, cellular function down to biochemical interactions and signaling pathways within cells.

To gain experience with and to apply MatLab and Mathematica to acquire, analyse and evaluate biomedical signals and to model and simulate biomedical processes.

Inhoud vak

This course will start with a general overview the various types of models used to describe biomedical processes by parametric and non-parametric models using linear and non linear (differential) equations. Basic knowledge of vector and matrix calculations and differential equations is required but will be refreshed.

During the course, attention will be paid to finite element models, spectral analysis, compartment models, algorithms used in image analysis and models to describe molecular structures and their dynamic behaviour.

Examples will concentrate on cardiovascular function: finite element models to describe wall motion, image analysis of PET and Echo data, viscoelastic models of pressure volume relations, compartment models of the interaction between contractile proteins to simulate force and pressure development and a description of an ion pump for instance to import Ca-ions into the cell during an action potential.

The introductory lectures will be combined and followed by practical courses in which, through exercises, experience will be gained of MatLab and Mathematica (4th generation computer languages). Finally students will be offered a choice of 1 out of 5 modelling problems to be solved in groups of 2 or 3 students each, guided by a supervisor. At the end of the course each group will present and discuss their work with all participants and supervisors of the course.

Onderwijsvorm

Lectures, working groups, assignments.

Toetsvorm

Assignments, presentation and final written exam. The overall score will be calculated as the weighed average of the scores for the assignments, presentation and written exam.

Literatuur

Syllabus.

Book (recommended): Gilat, A., MatLab: An Introduction with Applications 4th ed, Wiley.

Doelgroep

mCh-SBI, mMNS-MPs, mMNS-PoL, mMNS-MPy, mPhys-PLH, mPhys-SBI

Biomedical Optics

Vakcode	X_428529 (428529)
Periode	Periode 4

Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

The course description is; available on

<http://studiegids.uva.nl/web/uva/sgs/en/c/10865.html>

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht.

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>.

Biophotonics III: Practical Training

Vakcode	AM_470630 ()
Periode	Periode 3
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. ir. Y.J.M. Bollen
Niveau	400

Doel vak

To introduce students into the application of various optical techniques, mainly fluorescence spectroscopy and microscopy.

Students should be able to:

- plan and conduct experiments using optical techniques
- evaluate results on the basis of theoretical knowledge and recent literature
- present their results in short reports and one journal-style paper

Inhoud vak

Optical spectroscopy and microscopy are widely used in cell biology and biophysics. In this course students will obtain hands- on experience with absorption spectroscopy, fluorescence spectroscopy (e. g. FRET and anisotropy) and fluorescence microscopy. The theory behind these techniques is already given in Biophotonics 1, which is required to enter this course. Small groups of students will prepare the experiments, discuss them with the lecturer and carry them out. The group will write a short report on each experiment and one journal-style paper.

Onderwijsvorm

Experiments (± 24 hours) are performed in small groups. Experiments need to be prepared and reports need to be written.

Toetsvorm

Participation during labwork and discussion (individual; 30%); written report (per group; 70%).

Literatuur

Reader (5 euro)

Papers and protocols that will be made available through Blackboard

Vereiste voorkennis

Biophotonics: Microspectroscopy (AM_470629) or Microscopische beeldvorming (X_420529) are required to enter this course.

Doelgroep

MSc students Biology, Biomolecular Sciences, Biomedical Sciences, Medical Natural Sciences, Physical Sciences, Chemistry or related.

Overige informatie

The theoretical background of the techniques used here is discussed in Biophotonics: Microspectroscopy (AM_470629).

BioSolar Cells

Vakcode	X_428531 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.P. Dekker
Docent(en)	dr. J.P. Dekker
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak

To obtain insight in the three main themes of BioSolar Cells (in short research to improve the efficiency of photosynthesis in plants, research to produce biofuel from algae on a semi-industrial scale and research to convert solar energy directly into a fuel in an artificial leaf with very high efficiency), and to perform a literature study on one of the themes from BioSolar Cells.

Inhoud vak

BioSolar Cells is a Dutch national research programme with the aim to optimize the photosynthesis process in plants, algae and bacteria, and to develop 'artificial leaves' that combine biological and artificial components. The course will start with interactive lectures by experts on each of the three themes from BioSolar Cells. The students will have to read one or two papers before each lecture and formulate research questions, after which the lecturer gives his/her lecture and the questions are discussed. In the second stage of this course, the students choose a research topic, conduct a literature study, prepare a scientific review paper and present their work in a session with all participating students and staff.

Onderwijsvorm

Interactive lectures and literature study.

Toetsvorm

Assessment of scientific review article and of a presentation.

Literatuur

Scientific papers

Doelgroep

mCh-SES, mPhys

Business Management in Health and Life Sciences

Vakcode	AM_470584 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	prof. dr. H.J.H.M. Claassen
Docent(en)	prof. dr. H.J.H.M. Claassen
Lesmethode(n)	Hoorcollege, Computerpracticum
Niveau	500

Doel vak

To acquire insight in different legal entities in which to organise a company or enterprise

To get acquainted with:

- financial and legal aspects
- patents and alternative valorization methods
- marketing and sales aspects of businesses

To acquire insight in Human Resource Management models

To get acquainted with different models of financing

To learn to think and act in line with economic and sustainability issues for the company

Inhoud vak

Increasingly, health students will be confronted with a corporate way of thinking in health organisations. To function in such an environment it is critical that students have basic knowledge of fiscal and legal entities and organisational forms of corporate structures (including start-ups). Furthermore, they have to understand what motivates decision makers and financial officers in different companies (also geographical differences). This course comprises a theoretical and a practical part. The theoretical part consists of interactive classes with various experts from the field. Topics that will be dealt with in detail include: intellectual property, portfolio management, finance, risk capital, grants and subsidies, team building and people management, different legal entities, fiscal and legal aspects when starting a new company, SWOT analysis in the life sciences and clinical trials. The practical part consists of bringing the knowledge acquired during the classes into practice in an assignment in which you develop a (personal career) businessplan.

Onderwijsvorm

Lectures: 35h

Assignment: 4h

Work on assignment (self study): 40h

Preparing the exam: 81h

Toetsvorm

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

Literatuur

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

Doelgroep

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

Overige informatie

Guest lecturers/organisations:

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

Business, Innovation and Value Creation in the Life Science Industry

Vakcode	X_432723 ()
Periode	Periode 3
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	drs. P. van Hoorn
Docent(en)	prof. dr. I.J.P. de Esch, drs. P. van Hoorn
Lesmethode(n)	Hoorcollege
Niveau	500

Doel vak

Business Innovation and Value Creation in the Life Sciences Industry aims to provide two distinct goals:

- a. To provide in depth and comprehensive insight in current business , innovation and entrepreneurship trends, approaches and state-of-the-art practice in the LSI through theory, literature and case analysis.
- b. To utilize and apply insights and experiences gained under a. in a personal live entrepreneurship case in which each individual student elects a case. And develops a business plan according to a set methodology. Essential parts of this process include: building strategy, business modeling, transactional modelling, building a value proposition, leveraging IP, marketing and commercialization planning.

Inhoud vak

The LSI landscape is shown in several ways:

1. Understanding the Pharma Biotech and Health Care sectors and its primary and secondary drivers, including the contributing sciences
2. Understanding relevant business, value chain and innovation models that are common in these industries and sectors
3. Understanding typical product life-cycle dynamics in the Pharma and Biotech and related Health sectors
4. Understanding the relative contribution and position of Genomics, Proteomics and other scientific specialization areas in the future of Health and Life Sciences
5. Understanding current product categories and the future of diagnosis, therapy and prevention

In addition to lectures on the above topics, students will be handed certain texts and articles that illustrate the 'State of the Art' in the LSI sector from both a product development as well as from a business development standpoint.

As a result the student will get insight into the business decisions and dynamic that are linked to basic bio-scientific research from inception through to product development and commercialization. The course thus aims to provide a general overview of how life science and business are interwoven in everyday industrial practice.

Two 'real-life' cases will be discussed and students will get a group assignment in which the cases will have to be analyzed and certain questions will have to be answered. Each group writes a short analysis and subsequently presents this in front of the whole group.

Subsequently, each student will engage in a personal assignment as described above. The outputs will consist of a presentation before the whole group. The aim is to provide as real life a setting as is possible.

Onderwijsvorm

A mix of lectures, guest lectures, Pharma sector casework and related assignments. Individual coaching on the business planning exercise. Outputs include report and oral presentations and a final written exam.

Toetsvorm

In order to receive 6 credits for this course, the following criteria must be met:

- the written exam must be passed with a grade 6 or more (60% of final grade)
- the assignment must be completed with a written document and short presentation before the group (40% of final grade)

Literatuur

Selected scientific publications

Harvard Business Cases as posted on blackboard.

New World Drug Development by R Robert M. Rydzewski 2008

Business Model Generation – Osterwalder 2010

Vereiste voorkennis

Completed Bachelor SBI or comparable

Aanbevolen voorkennis

Completed Bachelor SBI or similar

Doelgroep

M Chem -SBI or M Physics - SBI

Catalysis for sustainable energy

Vakcode	X_437027 ()
Periode	Periode 4
Credits	6.0
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	500

Inhoud vak<http://studiegids.uva.nl/web/uva/sgs/nl/c/14334.html>**Overige informatie**

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

CERN Research Project

Vakcode	X_420116 (420116)
Periode	Periode 4+5+6
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H.J. Bulten
Niveau	500

Inhoud vak

The course description is available on <http://studiegids.uva.nl/web/uva/sgs/en/c/156.html>

Doelgroep

mPhys-PPAP

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

CERN Summer Student Lecture Programme

Vakcode	X_420122 (420122)
Periode	Periode 4+5+6
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H.J. Bulten

Niveau	500
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Doelgroep

mPhys

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Chemical Biology

Vakcode	X_432538 (432538)
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. R. Leurs
Docent(en)	prof. dr. R. Leurs
Lesmethode(n)	Hoorcollege, Computerpracticum
Niveau	400

Doel vak

To get students acquainted with modern chemical biology techniques to modulate DNA, RNA and protein function.

Inhoud vak

In this course emphasis will be given on the interface between Chemistry and Biology. How can one understand biological processes by using small molecules? How can one identify small molecules targeting new biochemical pathways, either by using modern biochemical or cellular assays (e.g. SPR, FRET, BRET, High-content & High resolution analysis), or in silico using the wealth of new information from structural biology. How to detect and modulate DNA, RNA and protein function with chemical probes. Moreover, detection of proteins and their interactions with other molecules will be discussed in detail.

Onderwijsvorm

Lectures, tutorials, and computer practicals.

Toetsvorm

Assignments (100%)

Literatuur

Selected book chapters from Comprehensive Medicinal Chemistry II, 2007, Elsevier, Editors-in-Chief: John B. Taylor and David J. Triggle (available at VU library as e-book) and primary literature.

Vereiste voorkennis

Bachelor Pharmaceutical Sciences, Medical Natural Science, Science, Business and Innovation or Chemistry, Portal course MSc Biomolecular Science, Signal Transduction in Health and Disease, or equivalent

Doelgroep

mBMS-BC, mCh-SBI, mDDS-BCCA, mDDS-CMCT, mDDS-DD&S, mDDS-DDSA, mDDS-DDTF, mDDS-C-var, mDDS-E-var, mDDS-M-var, mPhys-SBI

Classical and quantum Chaos

Vakcode	X_428534 ()
Periode	Semester 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

The course description is available on

<http://studiegids.uva.nl/web/uva/sgs/nl/c/10909.html>

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Clinical development and clinical trials

Vakcode	AM_470585 ()
Periode	Periode 3
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	W.S. Konijn MSc
Docent(en)	prof. dr. H.J.H.M. Claassen
Lesmethode(n)	Hoorcollege, Computerpracticum, Werkgroep
Niveau	500

Doel vak

To acquire knowledge and insight into the role and objectives of drug and clinical development process

To acquire knowledge and insight into the clinical pharmacology in drug development, drug interactions, pharmacodynamic and metabolic interactions

To acquire knowledge and insight into clinical study methodology

To acquire knowledge and skills into the regulatory principles

To acquire knowledge of ICH-GCP and quality

To acquire knowledge and insight into clinical trial coordination

To acquire knowledge and skills into the data management and statistics.

To acquire insight into the ethical aspects

To acquire insight into actual use of clinical trials in R&D strategies

To learn to design a clinical study

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

Inhoud vak

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

Onderwijsvorm

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

Toetsvorm

Written exam: 100%

Literatuur

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

Doelgroep

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

Overige informatie

Guest lecturers/organisations:

- Eric Klaver
- DOCS
- Others to be announced

Colloquium and Literature Thesis

Vakcode	X_422536 (422536)
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Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. M.H.M. Janssen
Niveau	600

Overige informatie

Period: Variable

Colloquium and Literature Thesis

Vakcode	X_422538 (422538)
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. D. Iannuzzi
Niveau	600

Doel vak

Literature study on a subject decided by the student after approval of the coordinator.

Onderwijsvorm

Zelfstudie - Supervision by group members of the hosting group.

Toetsvorm

The exam consists of a written report and an oral presentation.

Literatuur

To be found by the student in collaboration with the supervisors.

Doelgroep

mPhys

Overige informatie

Period: Variable

Colloquium en afstudeerverslag - Particle Physics and Astroparticle Physics

Vakcode	X_422520 (422520)
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H.J. Bulten
Niveau	600

Overige informatie

Period: Variable

Colloquium en afstudeerverslag - Theoretical Physics

Vakcode	X_422519 (422519)
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	600

Inhoud vak

A Master Project is supervised by a staff member of VU or UvA. The project spans a full year (60 Credits including Colloquium and Master Thesis). There is a second person involved, preferably from a different research group, who judges the colloquium and the (more general aspects of the) Master Thesis.

See: Master Project Physics (X_422509)

Overige informatie

Period: Variable

Communication, Organization and Management

Vakcode	AM_470572 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. J. Maas
Docent(en)	dr. H. Wels, prof. dr. F. Scheele, dr. M.B.M. Zweekhorst
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Doel vak

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

Inhoud vak

Organisations in the health and life science sector are changing fast, a phenomenon driven by newly emerging technologies and increasing societal complexity. A growing number of students with a beta degree will hold

professional and managerial functions in these organisations. During this course students will learn how to be effective performers within these environments, both individually and in teams. This requires an understanding of the macro aspects of organisational behaviour, including designing organisations, managerial skills and ways of strategic thinking. Several speakers conduct lectures on aspects as motivation, managing interpersonal behaviour, leadership, communication and developing and changing organisations. The speakers explain theories from literature and relate them to their practical experiences. In addition, the students interview managers in health organisations and analyse these interviews using the newly acquired theoretical concepts. Also, practical cases of health care companies will be analysed and discussed, resulting in advisory reports for management. With the other students you discuss your experiences and a coach helps you relate the experiences to theory.

Onderwijsvorm

Lectures (approximately 22 hours), response lectures (4 hours), self study, training workshops (12 hours), self-study and writing project assignment (approximately 120 hours).

Toetsvorm

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

Literatuur

To be announced on Blackboard

Doelgroep

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

Overige informatie

Attendance to training, workshops, interviews and discussions is indispensable

Computational Methods

Vakcode	X_420014 (420014)
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H.J. Bulten
Docent(en)	dr. H.J. Bulten
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	400

Doel vak

- Acquaintance with popular numerical methods in physics
- Critical assessment of numerical approaches
- Hands-on experience with the solution of problems in computational

physics

Inhoud vak

In this course, numerical techniques will be discussed that can be applied to computational problems that cannot be solved analytically. The student should gain understanding of the source of numerical errors and how they can be minimized via the selection and tuning of numerical algorithms. Various topics will be addressed, including integration, Fourier Analysis, Monte Carlo techniques, Eigensystems and evolution of coupled differential equations. During the course routines from the book Numerical Recipes in C++ Press et al. are used. These routines are also available in C and Fortran77. Although a short tutorial is given on coding, compiling and debugging, some prior experience in programming in C++ (or C) is expected and highly recommended..

Onderwijsvorm

Oral presentation and tutoring of pairs of students working on projects.

Toetsvorm

Exercises given during the course determine the grade.

Literatuur

Press, Teukolsky, Vetterling, and Flannery, Numerical Recipes. The version of this book for the programming language C is available on the web at <https://www.fizyka.umk.pl/nrbook/bookcpdf.html> .

Doelgroep

mPhys-TP, mPhys-PPAP

Current Sustainable Energy Technologies

Vakcode	X_422582 ()
Periode	Periode 3
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.P. Dekker
Docent(en)	dr. J.P. Dekker, dr. R.N. Frese
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	500

Doel vak

To obtain a complete overview of the technical, economic and societal feasibilities of all possible forms of sustainable energy, including relevance and positive and negative effects. The students should be able to explain the basic features of these technologies and should also be able to make quantitative predictions for each of these technologies.

Inhoud vak

In week 1, students read all chapters of the book and formulate for each chapter a technological and/or economic/societal question. The question will be accompanied with hypothetical answers or estimations or working hypotheses. Answers must be as quantitative as possible. In week 2, students will present and discuss their questions and hypotheses with their group. Then, participants will be handed specific assignments for

further research. In week 3, students will present the results of their further research, and will receive feedback from the other participants in their group. In week 4, students will give their final presentations to all participants of the course and will hand in the final report of their work.

Onderwijsvorm

Introductory lecture in week 1, two discussion per week in weeks 2 and 3 in groups of about 8 students, final meeting with all participants in week 4.

Toetsvorm

Initial questions, hypothetical answers and participation in the discussion result in 50% of the grade. The final document constitutes also 50% of the grade. All documents will be graded by two independent lecturers, their marks will be averaged. Both parts need to have a mark of 6.0 or higher.

Literatuur

David J.C. Mackay (2008) Sustainable energy – without the hot air, available free online at <http://www.withouthotair.com>

Vereiste voorkennis

mCh-SBI

Doelgroep

mCh-SBI, mPhys-SBI, mCh-SES, mPhys-SES

Disability and Development

Vakcode	AM_470588 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. W.H. van Brakel MD
Docent(en)	H.B. Miranda Galarza MSc, F.M. Budge MSc
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Doel vak

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

interventions

- To acquire skills and knowledge in measurement and research methods relevant to disability
- To understand the importance of inter-sectoral collaboration
- To gain insight in participatory approaches

Inhoud vak

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

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

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

The 4-week course programme will include the following subjects:

- Disability models and stereotypes,
- Frequencies and distribution of disability,
- Experience of having a disability,
- ICF conceptual framework,
- Disability rights, including the UN Convention on the Rights of Persons with Disabilities,
- Culture and disability,
- Determinants of disability, including stigma and discrimination, poverty, gender and HIV/AIDS,
- Measurement of disability,
- Disability-relevant research methods, including survey methods, examples of disability research
- An introduction to community-based rehabilitation.

Onderwijsvorm

Problem-based learning supported by lectures and an article writing assignment

The programme comprises 168 study hours, divided as follows:

- Lectures: 36
- Tutorial groups: 18
- Other events: 12
- Self-study: 102

Toetsvorm

Participation in tutorial groups: 10%

Take-home examination, submitted electronically: 60%

Scientific article: 30%

Literatuur

See e-reader

Vereiste voorkennis

Bachelor-level education; any subject

Doelgroep

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

Overige informatie

Jacqueline Kool, MA

Lydia la Rivière-Zijdel, MA

Dynamics of Biomolecules and Cells

Vakcode	X_422583 ()
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.T.M. Kennis
Examinator	dr. J.T.M. Kennis
Docent(en)	dr. J.T.M. Kennis
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak

Life is, by its very definition, a dynamic quantity. In this course an overview is given of dynamic processes that take place in biomolecules, membranes and cells in relation to biological functionality, and the biophysical methods that are applied to study them.

Inhoud vak

The significance of small movements to large-scale and slow reorganizations are being discussed as well the experimental techniques employed.

- DNA processing and dynamics (techniques: optical tweezers, AFM, tethered particle motion, magnetic tweezers). DNA structure and stability, DNA/RNA polymerase, DNA architectural proteins, DNA repair.
- Protein dynamics (techniques: ultrafast spectroscopy, Infrared and Raman spectroscopy, single-molecule fluorescence). Photoactive proteins, light-driven enzymes, Motor proteins, optogenetics.
- Membrane dynamics and remodeling (techniques AFM, single molecule, electron microscopy). Photosynthesis, crowding and membrane protein diffusion, Neuroimaging.

-superresolution microscopy

Onderwijsvorm

Hoorcolleges, literatuur essay, mondelinge presentatie literatuur

Toetsvorm

- Essay (literature or research proposal)
- Oral literature presentation
- written Exam

Literatuur

Notes, handouts and papers.

Vereiste voorkennis

BSc. Physics, BSc. Medical Natural Sciences, BSc Chemistry or comparable

Doelgroep

mMNS-PoL, mPhys-LSBP, mPhys-PLH

English Academic Course

Vakcode	X_437028 ()
Periode	Periode 2+3, Periode 5+6
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

<http://studiegids.uva.nl/web/uva/sgs/nl/c/11181.html>

Doelgroep

mCh, mPhys

Overige informatie

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Entrepreneurship in Health and Life Sciences

Vakcode	AM_470575 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	prof. dr. E. Masurel
Docent(en)	prof. dr. E. Masurel
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Doel vak

Students obtain knowledge about and insight in the relevance of entrepreneurship and innovation for their own discipline. Students learn

about the processes which are involved in the recognition and exploitation of opportunities, about creating economic and social value and about the nature and role of networks. In addition students gain knowledge of different entrepreneurial processes and the importance of valorisation of (bio)medical findings and business ideas for a knowledge-based economy.

Learning objectives

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

Inhoud vak

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

Onderwijsvorm

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

Schedule and study time

The total study time is 160 hours.

Tuition methods include lectures, consultancies and self-study.

The different elements have the following study time:

- lectures 18 hours
- consultancies 8 hours
- writing feasibility plan 65 hours
- self study 65 hours
- examination 4 hours

Toetsvorm

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

Literatuur

To be announced on Blackboard

Doelgroep

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

Overige informatie

Attendance is compulsory. Prior knowledge: Business Management in Health and Life sciences. For information and application:

anna.van.luijn@falw.vu.nl

Environmental Chemistry

Vakcode	X_437004 (437004)
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

The course description is available at

<http://studiegids.uva.nl/web/uva/sgs/nl/c/14420.html>

Doelgroep

mCh-AS, mCh-MDSC, mCh-SES, mPhys-SES

Overige informatie

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

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 prejudices

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.

Ethics in Public Health

Vakcode	AM_470805 ()
Periode	Ac. Jaar (september), Periode 3
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. M.J.P.A. Janssens
Docent(en)	dr. M.J.P.A. Janssens
Lesmethode(n)	Hoorcollege

Doel vak

Analysing and understanding the ethical aspects of public health research, enabling students to make responsible decisions in research

Inhoud vak

Recent case studies will be analyzed concerning topics as life style enhancement, reproductive technologies, health care research, and preventive health care. Three sessions are dedicated to student presentations which will be discussed in plenary sessions. In three other sessions, the lecturer will introduce and discuss actual developments in the ethics of public health:
reproductive technologies;
prevention and life style enhancement;
medical research involving human subjects. Also, throughout the course, attention will be paid to the practical relevance of fundamental ethical-philosophical questions.

Onderwijsvorm

Lectures, workgroups, assignments

Toetsvorm

Essay and active participation

Doelgroep

Compulsory course for master students in Lifestyle and Chronic Disorders

Expertise and coördination in Knowledge Intensive Firms

Vakcode	X_432738 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Docent(en)	dr. H.C. Bruns
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	400

Doel vak

This course provides a theoretical framework for understanding how firms coordinate diverse expertise. Students become familiar with the most recent insights and questions in the literature on expertise and coordination. They learn how to recognize and analyze problems of coordination and to design solutions for work across diverse expert domains. They also practice their academic writing and analytical

reasoning skills.

Inhoud vak

One of the prime organizational challenges is to coordinate across multiple diverse specializations. In organizations, work is distributed across departments, and employees become specialized in their job. Research is organized in disciplines, and scientists become expert at specific questions. While experts become very efficient in their own domain, they also become entrenched in their viewpoints and more unwilling and unable to reach across disciplinary and departmental divisions. Yet, we know that breakthrough knowledge and innovation arises at the interface of expert domains. Therefore, organizations have to integrate diverse specializations to fully leverage expertise. This course draws from literature such as expert knowledge, decision-making, and innovation to explore the fundamental coordination problem of the firm.

Onderwijsvorm

This course consists of six interactive seminar sessions and three tutorials. Students have to prepare assigned readings for each session.

Toetsvorm

Class participation (30%) and final written assignment (70%)

Literatuur

selected articles

Vereiste voorkennis

Technology & Innovation (Prof. Bossink)

Doelgroep

mCh-SBI, mPhys-SBI

Overige informatie

Enrollment is capped at 40 students.

Fermi Quantum Gases

Vakcode	X_428514 (428514)
Periode	Semester 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

The course description is available on <http://studiegids.uva.nl/web/uva/sgs/en/c/11045.html>

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Flavour Physics and CP Violation

Vakcode	X_428539 ()
Periode	Periode 4
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. R. Fleischer
Docent(en)	prof. dr. R. Fleischer
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	400

Doel vak

This course will give a detailed discussion of the quark-flavour sector of the Standard Model and the theoretical framework to describe CP-violating phenomena and rare decays. The students will encounter calculations of specific meson decays and of low-energy effective Hamiltonians, including a discussion of QCD corrections. The main objective is that the students should after the course be in a position to understand the main challenges in quark-flavour physics, should be able to write down the Feynman diagrams for any given meson decay and should be able to calculate general expressions for the corresponding transitions amplitudes and observables.

Inhoud vak

Symmetries and their violation play an outstanding role in particle physics. A key example is CP violation, where C and P denote the charge-conjugation and parity transformations, respectively. In the Standard Model, this phenomenon is closely connected with the quark-flavour sector, which is still a big mystery. A particularly interesting laboratory to explore CP violation and quark-flavour mixing is given by B mesons, which are composed of a heavy b quark and a light anti-quark. After a general introduction and motivation, we shall discuss the quark-flavour sector of the Standard Model, classify B-meson decays, introduce the theoretical tools to deal with them (such as low-energy effective Hamiltonians), investigate the requirements for non-vanishing CP-violating asymmetries, and discuss the most important benchmark decays, which include some of the rarest processes Nature has to offer. We will also confront theory with experiment by addressing the picture emerging from the most recent data of the Large Hadron Collider at CERN.

Onderwijsvorm

To be decided depending on the number of participants.

Toetsvorm

Oral or written (depending on the number of participants) exam.

Literatuur

<http://arXiv.org/abs/arXiv:0802.2882>

Vereiste voorkennis

This course requires elementary familiarity with Particle Physics and Quantum Field Theory.

Doelgroep

mPhys-PPAP, mPhys-TP

Overige informatie

This course is given at the Nikhef.

This course requires elementary familiarity with Particle Physics and Quantum Field Theory and is a elective in the Theoretical Physics Track, which may be useful for other tracks such as GRAPPA and Particle and Astroparticle Physics. It is complementary to the course 'Physics of Anti-matter' (UvA_5354CPVI3Y), which is given at the Nikhef Institute as a 3 ECTS course preceding this course.

Forensics with complex liquids

Vakcode	X_428538 ()
Periode	Semester 2
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

The course description is available on <http://studiegids.uva.nl/web/uva/sgs/nl/c/14306.html>

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

From Genome to Physiome

Vakcode	X_420127 (420127)
Periode	Semester 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

The course description is available on <http://studiegids.uva.nl/web/uva/sgs/en/c/146.html>

Doelgroep

mPhys-PLH

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

UvA coordinator: dr. N.T.P. Bakker

General Relativity

Vakcode	X_420128 (420128)
Periode	Semester 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege
Niveau	400

Inhoud vak

The course description is available on <http://studiegids.uva.nl/web/uva/sgs/en/c/157.html>

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Gravitational Waves (Selected Topics in Gravitation and Cosmology)

Vakcode	X_428506 (428506)
Periode	Semester 2
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H.J. Bulten
Niveau	400

Inhoud vak

This course is given at the UvA. For the description, please visit <http://studiegids.uva.nl/web/uva/sgs/en/c/10673.html>

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Green Chemistry

Vakcode	X_430557 (430557)
Periode	Periode 1
Credits	6.0
Voertaal	Nederlands
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. K. Lammertsma
Lesmethode(n)	Hoorcollege
Niveau	300

Doel vak

Acquiring knowledge of the general ideas of green chemistry and their importance in the development of sustainable chemical technology.

Inhoud vak

Sustainability and green chemistry focuses on 12 principles. Aspects like atom efficiency, chemical waste and manufacturing processes will be highlighted as well as catalysis, solvents, biomass, solar energy, alternative feedstock, energy consumption, and safety, all in the context of chemical sustainability. Important ingredients in the course are student presentations on these topics, assignments on selected topics, and an evaluation of the merits of the biobased economy.

Onderwijsvorm

Lectures, Group/Individual Assignments and Presentations

Toetsvorm

Written/oral examination, assignments, reports

Literatuur

Lancaster, M., Green Chemistry: An Introductory text. Cambridge: RSC (ISBN 0854046208).

The Dutch rapport "Naar groene chemie en groene materialen" - Kennis- en innovatieagenda voor de biobased economy, 2011 – or a similar English rapport.

Doelgroep

mCh-SBI, mPhys-SBI, mCh-SES, mPhys-SES

Group Theory

Vakcode	X_420025 (420025)
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Docent(en)	B.L.G. Bakker
Lesmethode(n)	Hoorcollege
Niveau	400

Inhoud vak

The course description is available on

<http://studiegids.uva.nl/web/uva/sgs/en/c/2135.html>

Overige informatie

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Health, Globalisation and Human Rights

Vakcode	AM_470818 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. C.W.M. Dedding
Docent(en)	prof. dr. P. Heutink, dr. M.G.B.C. Bertens
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Doel vak

To acquire knowledge and understanding of the relationship between global public health issues and the global protection of human rights
To analyse how violations of human rights affect health and well-being
To learn methods of human rights assessment in relation to innovations in health technology
To acquire insights into the cultural dimensions of human rights values in relation to public health

Inhoud vak

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

Onderwijsvorm

Contact hours

Lectures: 33 hours

Work groups: 10 hours

Group project, simulation and exam: 8 hours

Self study and preparing: remaining hours

Toetsvorm

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

Literatuur

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

Doelgroep

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

Overige informatie

Guest lectures and guest organisations (under reservation):

Christine Dedding (Children and rights)
Fiona Budge (Culture and Health)
Bert Keizer (Elderly Rights)
Els Mons (Rights and disabled persons)
Women on Waves
Doctors without Borders
And more to be announced.

For more information contact Anna van Luijn: a.van.luijn@vu.nl

Heterogeneous Catalysis

Vakcode	X_428013 ()
Periode	Periode 3
Credits	6.0
Voertaal	Nederlands
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Doel vak

<http://studiegids.uva.nl/xmlpages/page/2014-2015/zoek-vak/vak/14343>

Homogeneous Catalysis

Vakcode	X_435668 (435668)
Periode	Periode 5
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege
Niveau	400

Inhoud vak

The course description is available at <http://studiegids.uva.nl/web/uva/sgs/en/c/205.html>

Overige informatie

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Hydrodynamics

Vakcode	X_428536 ()
Periode	Semester 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	500

Inhoud vak

The course description is available on

<http://studiegids.uva.nl/web/uva/sgs/nl/c/138.html>

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Innovation in Medical Technology to Improve the Health Care System

Vakcode	X_430602 ()
Periode	Periode 6
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. ir. T.J.C. Faes
Docent(en)	dr. ir. T.J.C. Faes
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	500

Doel vak

In innovative development of medical devices the Dutch Health Care System is the natural environment where medical devices need to demonstrate their quality. The aim of the course is to acquire knowledge of the Dutch Health Care System from the perspective of medical devices.

Inhoud vak

To be successful in innovation of medical devices one needs knowledge of the 1) Dutch Health Care System, 2) use and users of medical devices, 3) standards and legislation for medical devices, 4) measures of quality of medical devices, and 5) best practice in assurance of quality and safety of medical devices.

Onderwijsvorm

Lectures and working groups.

Toetsvorm

Short written report & oral presentation on a specific medical device.

Internship Communication Specialisation

Vakcode	AM_471148 ()
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. R.J. van Belle-van den Berg
Niveau	600

Internship Societal Specialisation

Vakcode	AM_471147 ()
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. R.J. van Belle-van den Berg
Niveau	600

Introductie Medische Beeldbewerking

Vakcode	X_432630 (432630)
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. ir. T.J.C. Faes
Docent(en)	dr. J.C. de Munck
Lesmethode(n)	Hoorcollege, Practicum
Niveau	300

Doel vak

The main goal of the course is to teach students how to apply basic image processing tools on medical images using MATLAB®. The student will be able to write efficient MATLAB® applications to addresses and solve a range of clinical research questions.

Inhoud vak

Image analysis methods play an increasingly important role in medical science and clinical patient care. This course discusses the most important image analysis techniques and explains how they can be applied. These include image histogram analysis, neighbourhood processing, image fusion, and morphological operations. Rationales for using these techniques are illustrated with examples from several

imaging modalities and clinical fields. The student then learns how to apply these techniques practically using MATLAB®. The final mark is the average of the mark obtained at the written examination and the mark obtained at the final practical assignment.

Onderwijsvorm

lectures and practicals.

Toetsvorm

50% written examination,

50% assignment practical work.

Both should be sufficient to pass the exam.

Literatuur

McAndrew, A. Introduction to Digital Image Processing with MATLAB®.

(ISBN 0-534-40011-6). This book will be made available through the

lecturers at a price of around 60 euros.

Vereiste voorkennis

Two years of studies in Medical Natural Sciences, Physics, Mathematics,

or Movement Sciences.

Lasers and Quantum Optics

Vakcode	X_422539 (422539)
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. W. Vassen
Docent(en)	dr. W. Vassen
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	400

Doel vak

To provide insight into the theory of light, light-matter interactions and lasers.

Inhoud vak

- Classical Optics (Maxwell's equations, diffraction and interference)
- Nonlinear Optics
- First- and second order coherence
- Radiative transitions in atoms, Einstein coefficients, transition rates, width of spectral lines
- Lasers
- Photon statistics, shot noise
- Photon antibunching
- Coherent states
- Photon number states
- Atom-photon interactions; density matrix, Rabi oscillations, Bloch sphere
- Laser cooling and trapping

Onderwijsvorm

Lectures, exercises.

Toetsvorm

Written exam.

Literatuur

Mark Fox, Quantum Optics (Oxford university Press 2006).

Doelgroep

mMNS-PoL, mPhys-AMEP, mPhys-PLH, mCh-MSP

Literature Study mPhys-PLH

Vakcode	X_422585 ()
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. S.M. Witte
Niveau	500

Literature Thesis SES

Vakcode	X_432785 ()
Periode	Ac. Jaar (september)
Credits	12.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.C. Slotweg
Niveau	600

Toetsvorm

report and presentation

Doelgroep

mCH-SES, mPhys-SES

Management of Sustainable Innovation

Vakcode	X_432739 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. R.J.A. Klein Woolthuis
Docent(en)	dr. R.J.A. Klein Woolthuis
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	400

Doel vak

Sustainable innovation is crucial to counter the challenges our societies are facing: energy without CO2 emissions, access to water and food, reliable banks, affordable elderly care, climate resilient cities. All fields require a structural rethink of existing systems, and introduction of new products, services, and structures to make a sustainable future possible.

This course has the objective to:

1. make students aware of the importance of a deep understanding of sustainable innovations for future business professionals
2. increase the understanding of how companies, public and government are interrelated in addressing and solving sustainability issues
3. explain how sustainable innovation can hence be managed on and across team, company and system levels

This last learning goal has to be made explicit in the assignment of assessing the sustainability reports of companies and making concrete proposals for improving their sustainability performance.

Inhoud vak

A paradigm shift is happening at this moment. Where over the past decades firms were focused on creating shareholder value, the creation of 'shared value' is now gaining terrain: leading management scholars like Peter Senge and Michael Porter are describing how companies from Nike to Tesco create value by including all stakeholders in their firm's strategies. New strategies are centred around respect for the environment, employees, and other stakeholders as to create positive self-reinforcing cycles of value creation. This requires fundamentally different management models in which collaboration with a wide array of stakeholders is key.

Sustainability is hence no longer a story of wishful thinking or environmental activists, it is at the core of corporate strategy and decision making. Moreover, growth in sustainable markets as renewable energy, organic food, and e.g. fair trade products is double digit year after year. Management of sustainable innovation should hence be in the forefront for every business scholar.

The course will start with explaining the importance of sustainability issues and of sustainable innovations.

Second the course will deeply go into theory on

1. why companies should become more sustainable
2. how companies can do so

Students will be required to develop a deep understanding of how changing norms and values in our society, change the way business is done. They will be required to learn to see our economies as systems rooted in belief systems, and that companies have to have a systemic understanding of our economies and their role within them. This leads to a fundamentally different view on the roles of companies in our societies, and an important role for the future managers of sustainable innovation to strive towards this new reality.

Onderwijsvorm

Lectures are given by:

- Rosalinde Klein Woolthuis (Feweb), coordinator

- Bart Bossink (FEW)
- Several guest lecturers

Two Lectures a week will be given.
Lectures on the first day will discuss theory. Prior reading of the literature is a requirement to participate in the classes.

Lectures on the second day will alternate between a guest lecture and discussion of the assignment.

Toetsvorm

Exam (70%), Assignment (30%); Average grade needs to be equal to or higher than 5.5 to pass for the course.

Literatuur

Bossink, B.A.G. (2012) Eco-innovation and Sustainability Management. New York: Routledge, pp. 182.

Senge, Peter M., Bryan Smith, Nina Kruschwitz, Joe Laur, Sara Schley, 2008, The Necessary Revolution: How Individuals and Organizations Are Working Together to Create a Sustainable World, Doubleday.

Several articles which will be placed on Blackboard.

Managing Science and Technology in Society

Vakcode	AM_470586 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. T.J. Schuitmaker-Warnaar
Docent(en)	dr. B.J. Regeer, dr. J.F.H. Kupper, dr. C.W.M. Dedding, dr. T.J. Schuitmaker-Warnaar, prof. dr. J.E.W. Broerse
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	600

Doel vak

In this course, students:

- acquire knowledge and understanding of philosophical and social science theories on science and technology development.
- gain insight into the mutual shaping of science & technology and society.
- acquire knowledge and understanding of the basic concepts and issues in the field of science and technology studies.
- acquire knowledge and understanding of the approach of constructive technology assessment.
- acquire knowledge and understanding of interactive methods for directing and guiding developments in science and technology.
- gain insight into the need for democratization of science and technology.
- learn to recognize and operate the central STS concepts in their own life worlds.
- learn to communicate verbally and in scientific writing about their knowledge and understanding and to critically reflect on that.

Inhoud vak

The 'Managing Science and Technology in Society' course offers an advanced introduction into the academic field of 'Science Technology & Society Studies'.

As an MPA student you are trained to operate at the interface of your natural science discipline and society, thereby making a contribution to answering the complex social problems arising in these areas. At the dawn of the 21st century, technology and science have an enormous potential for transforming life on earth. At the same time, the dimensions of our human culture shape the directions in which science and technology develop. The production of scientific knowledge and technological artefacts can solve some of our problems, but at the same time they give rise to new problems. During this course you will study the interactions of science and technology with society, and the various ways in which they mutually shape one another. These interactions invoke a lot of questions. Should we embrace genetically modified food? How do new human reproductive technologies interfere with the way we deal with sexuality and social responsibilities?

In this course you will get acquainted with a conceptual framework to critically assess these kinds of questions. It aims at understanding the intertwinement of science, technology and society, and the importance of a broad concern with these interactions, in order to shape our future in the way that we want it.

Onderwijsvorm

'Managing Science and Technology in Society' is a fulltime course of four weeks (6 ECTS). The course schedule is available on blackboard. The total study time is 168 hours. Tuition methods include lectures, work groups, a group project and self-study.

The different elements have the following study time:

- lectures 22 hours
- work groups 12 hours
- group project 32 hours
- self study (including mini-essays) 88 hours
- examination (take-home) 14 hours

Toetsvorm

The examination consists of:

- Mini-essay 1 (20%)
- Mini-essay 2 (20%)
- Final essay (take-home essay exam) (40%)
- SCOB-project (20%)

Literatuur

The literature of this course consists of selected chapters from the book *An introduction to science and technology studies*, Sergio Sismondo 2010, which can be purchased at the VU book shop. Complementary articles are provided for via blackboard, august 2013.

Doelgroep

Compulsory course within the second year of the Master Management, Policy Analysis and Entrepreneurship for the Health and Life Sciences (MPA)

Overige informatie

Guest Lecturers:

- Wouter Mensink (SCP, UvA)

- Harro van Lente (UU)
- Steven Flipse (TU Delft, De Proeffabriek)

More information: T.J.Schuitmaker@vu.nl

Master Project Particle Physics and Astroparticle Physics

Vakcode	X_422512 (422512)
Periode	Ac. Jaar (september)
Credits	54.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H.J. Bulten
Niveau	600

Master Project Physics: AMEP

Vakcode	X_422563 (422563)
Periode	Ac. Jaar (september)
Credits	48.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. M.H.M. Janssen
Niveau	600

Master Project Physics: AMEP

Vakcode	X_422560 (422560)
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. M.H.M. Janssen
Niveau	600

Master Project Physics: AMEP

Vakcode	X_422561 (422561)
Periode	Ac. Jaar (september)
Credits	36.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. M.H.M. Janssen
Niveau	600

Master Project Physics: AMEP

Vakcode	X_422562 (422562)
Periode	Ac. Jaar (september)
Credits	42.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. M.H.M. Janssen
Niveau	600

Master Project Physics: AMEP

Vakcode	X_422564 (422564)
Periode	Ac. Jaar (september)
Credits	54.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. M.H.M. Janssen
Niveau	600

Master Project Physics: PLH

Vakcode	X_422541 (422541)
Periode	Ac. Jaar (september)
Credits	36.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. S.M. Witte
Niveau	600

Master Project Physics: PLH

Vakcode	X_422540 (422540)
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. S.M. Witte
Niveau	600

Master Project Physics: PLH

Vakcode	X_422542 (422542)
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Periode	Ac. Jaar (september)
Credits	42.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. S.M. Witte
Niveau	600

Master Project Physics: PLH

Vakcode	X_422543 (422543)
Periode	Ac. Jaar (september)
Credits	48.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. S.M. Witte
Niveau	600

Master Project Physics: PLH

Vakcode	X_422544 (422544)
Periode	Ac. Jaar (september)
Credits	54.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. S.M. Witte
Niveau	600

Master Project Theoretical Physics

Vakcode	X_422509 (422509)
Periode	Ac. Jaar (september)
Credits	54.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. P.J.G. Mulders
Niveau	600

Inhoud vak

A Master Project is supervised by a staff member of VU or UvA. The project spans a full year (60 Credits including Colloquium and Master Thesis). There is a second person involved, preferably from a different research group, who judges the colloquium and the (more general aspects of the) Master Thesis.

Mathematica for physicists

Vakcode	X_428533 ()
Periode	Periode 3
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	500

Inhoud vak

The course description is available on
<http://studiegids.uva.nl/web/uva/sgs/nl/c/12391.html>

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Mathematische methoden

Vakcode	X_420105 (420105)
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. F.C. Mac Kintosh
Examinator	prof. dr. F.C. Mac Kintosh
Docent(en)	prof. dr. F.C. Mac Kintosh, B.L.G. Bakker
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	300

Doel vak

Vaardigheden opdoen met het hanteren van de wiskunde die in de theoretische natuurkunde wordt gebruikt.

Inhoud vak

Gewone differentiaalvergelijkingen; speciale functies; Legendre- en Besselfuncties, orthogonale polynomen; ontwikkelingen in orthogonale functies; integraalvergelijkingen; variatierekening.

Onderwijsvorm

Hoorcollege en werkcollege met gebruik van Mathematica notebooks.

Literatuur

Mathematics of Classical and Quantum Physics, Byron and Fuller.

Theoretical Mechanics of Particles and Continua, Fetter and Walecka.

Doelgroep

3N, 3WN, mPhys

Overige informatie

Gezien het accent dat gelegd wordt op praktische vaardigheden is het noodzakelijk regelmatig tijd te besteden aan de vraagstukken.

Medical Imaging

Vakcode	X_428526 (428526)
Periode	Periode 5
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

The course description is; available on <http://studiegids.uva.nl/web/uva/sgs/en/c/143.html>

Doelgroep

mMNS-MPs, mPhys-LSBP, mPhys-PLH

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht.

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>.

Minor Project Physics: AMEP

Vakcode	X_422572 (422572)
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. M.H.M. Janssen
Niveau	500

Minor Project Physics: AMEP

Vakcode	X_422573 (422573)
Periode	Ac. Jaar (september)
Credits	12.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. M.H.M. Janssen
Niveau	500

Minor Project Physics: AMEP

Vakcode	X_422574 (422574)
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Periode	Ac. Jaar (september)
Credits	18.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. M.H.M. Janssen
Niveau	500

Minor Project Physics: AMEP

Vakcode	X_422575 (422575)
Periode	Ac. Jaar (september)
Credits	24.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. M.H.M. Janssen
Niveau	500

Minor Project Physics: PLH

Vakcode	X_422548 (422548)
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. S.M. Witte
Niveau	500

Minor Project Physics: PLH

Vakcode	X_422549 (422549)
Periode	Ac. Jaar (september)
Credits	12.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. S.M. Witte
Niveau	500

Minor Project Physics: PLH

Vakcode	X_422550 (422550)
Periode	Ac. Jaar (september)
Credits	18.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen

Coördinator	dr. S.M. Witte
Niveau	500

Minor Project Physics: PLH

Vakcode	X_422551 (422551)
Periode	Ac. Jaar (september)
Credits	24.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. S.M. Witte
Niveau	500

Modelling and Simulation for Life Sciences

Vakcode	X_432732 ()
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. I.J.P. de Esch
Docent(en)	prof. dr. I.J.P. de Esch, dr. C. de Graaf
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak

To gain insight in the iterative aspects of (rational) drug design that enable efficient development of new medicines.

Inhoud vak

In the post-genome era, an unprecedented understanding of the processes that are involved in health and disease are becoming available. At the same time, an overwhelming amount of data describing the molecular characteristics of individual drug targets is becoming available. For example, the structure of many proteins is being determined using X-ray analysis and NMR techniques. These developments allow for the more efficient development of better and safer medicines. In this project, several techniques that can help to translate this data into novel ligands will be discussed and applied. Specific topics include crystal structure analysis, the building of homology models, docking of ligands, calculating binding free energy and affinity of ligands for the protein, de novo structure generation, and pharmacophore modeling. These techniques generate ideas for novel compounds. Because a design that cannot be synthesized is by definition a useless design, the synthetic feasibility is a key and integral part of the design process. Therefore, it is important to be able to define a synthetic pathway for the preparation of the designed compounds. An online retrosynthetic demonstration with a search engine sets the stage for a case study. For a specific design, a versatile and robust synthesis route has to be defined, and if needed, the design will be fine-tuned. This illustrates

an iterative cycle between different disciplines that is very common throughout the drug development process. Students will learn to appreciate the opportunities and difficulties in early drug discovery.

Onderwijsvorm

Project basis: including lectures, tutorials, self study, assignments and group-work on a case-study.

Toetsvorm

Written examination, preparation of a report.

Vereiste voorkennis

Bachelor SBI, Bachelor Pharmaceutical Sciences, Medical Natural Science, Chemistry, Portal course MSc Biomolecular Science, Signal Transduction in Health and Disease, or equivalent

Doelgroep

mCh-SBI, mPhys-SBI

Nanophotonics

Vakcode	X_428537 ()
Periode	Semester 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	500

Inhoud vak

The course description is available on

<http://studiegids.uva.nl/web/uva/sgs/nl/c/12692.html>

Overige informatie

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Networked Organizations and Communication

Vakcode	S_NOC ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Sociale Wetenschappen
Lesmethode(n)	Hoorcollege, Practicum, Werkgroep
Niveau	500

Doel vak

Students who have completed the seminar will be able to critically approach, interpret, and compare theories and literature on social networks, semantic networks, and networked organizations. They can write a literature review or essay about the developing field of networked organizations and communication. Moreover, they can carry out a small-scale research project (in groups) using two different network analysis

methods.

Inhoud vak

The seminar Networked Organizations and Communication aims at gaining in-depth insight into the antecedents and consequences of interpersonal-, interunit-, and interorganizational networks. The seminar begins with an introduction to network theory, general terms, and concepts. On the basis of recent network literature, the seminar then focuses on how organizations and organizational members become more connected to each other (e.g., through actor similarity, communication patterns, etc.) and how this affects various outcomes (e.g., job satisfaction, innovation activities, spread of hypes, firm survival, etc.). A particular focus will thus be on gaining insights into social and semantic networks and on two software programs with which one can analyze and visualize social or semantic networks.

Onderwijsvorm

Lectures combined with workshops about two different network analysis methods. Active participation in the lectures and workshops is required.

Toetsvorm

Possibly small tests during class, individual literature review or essay, group assignment (research project), and group presentations.

Literatuur

Series of articles to be announced on Blackboard

Vereiste voorkennis

Participation in Organization Sciences (S_OS).

Aanbevolen voorkennis

All students are recommended to study chapters 1, 2, 3, 7, and 10 of Kadushi, C., 2012: Understanding social networks. Oxford University Press: New York.

Non-BCO student who cannot participate in Organization Sciences (S_OS) are strongly recommended to study the literature of this course.

Doelgroep

MSc BCO track Strategie en identiteit, exchange students, and students SBI.

NIKHEF Project

Vakcode	X_420115 (420115)
Periode	Periode 4+5+6
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H.J. Bulten
Lesmethode(n)	Hoorcollege
Niveau	600

Inhoud vak

The course description is available on <http://studiegids.uva.nl/web/uva/sgs/en/c/2142.html>

Doelgroep
mPhys-PPAP

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Nuclear Fuels

Vakcode	X_432787 ()
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. L. Visscher
Examinator	prof. dr. L. Visscher
Docent(en)	prof. dr. L. Visscher
Lesmethode(n)	Hoorcollege

Doel vak

Introduce the principles of nuclear reactions relevant for energy production. Discuss the long-term perspectives of using nuclear fission and fusion as an energy source.

Inhoud vak

The course starts by introducing the basic principles of nuclear fission and fusion. The implementation into an working experimental fusion reactor will be discussed with particular attention to the interaction of the fusion plasma and the material wall of the device. For fission reactors we look at their current operation and the chemical aspects of the energy production: mining and (re)processing fissionable material and the possibilities for long-term storage of spent fuel. In the project part you will review the research in these fields.

Onderwijsvorm

Lectures, exercise classes and project (literature study).

Toetsvorm

Written exam, project report and presentation.

Literatuur

McCracken, G. and P. Stott, Fusion, the energy of the universe. Complementary Science Series. 2005, London: Elsevier Academic Press. 186.
Hand-outs.

Doelgroep

mChem-MSP, mPhys

Oriëntation Project

Vakcode	X_422580 ()
Periode	Periode 3, Periode 5
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. M.H.M. Janssen
Niveau	400

Doel vak

Kennismaking met AMEP research en AMEP researchgroepen.

Inhoud vak

Een stage van een maand in een vakgroep met een eigen wetenschappelijke opdracht, leidend tot een kort verslag en een presentatie.

Onderwijsvorm

Stage en/of Literatuurstudie

Doelgroep

mPhys-AMEP, 1e masterjaar

Overige informatie

Het totaal is 6 studiepunten. Studenten kunnen het deels (3 sp) in periode 3 volgen, gevolgd door 3 sp in periode 5, of in zijn geheel (6 sp) in periode 5.

Parameter Estimation Applied to Medical and Biological Sciences

Vakcode	X_432631 (432631)
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Docent(en)	dr. J.C. de Munck
Lesmethode(n)	Hoorcollege
Niveau	500

Doel vak

The course treats the theory of parameter estimation problems in general, but the theory is illustrated extensively by examples from medical and biological sciences and brain imaging (fMRI and MEG/EEG) in particular. Linear and non-linear regression analysis is treated, as well as confidence intervals and significance testing. The goal of the course is to provide insight into the theory of parameter estimation and to develop a critical attitude towards its application and interpretation in order to avoid inconsistent and improper use of the theory.

Inhoud vak

Linear-non linear parameter models, basic matrix-vector algebra, maximum likelihood principle, correlated-uncorrelated noise, OLS, GLS, nuisance parameters, linear (time invariant) filters, t-test, F-test, confidence intervals, fMRI data model, missing data, MEG/EEG source

localisation. These topics are treated in the form of a series of lectures alternated with exercises.

Extra topics: L1 en L2 norms.

Onderwijsvorm

Lecture.

Toetsvorm

Written exam.

Doelgroep

mMNS

Particle Cosmology

Vakcode	X_420560 ()
Periode	Periode 4+5+6
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

The course description is available on

http://studiegids.uva.nl/web/uva/2012_2013/nl/c/14319.html

Overige informatie

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>.

Particle Detection

Vakcode	X_420051 (420051)
Periode	Semester 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H.J. Bulten
Lesmethode(n)	Hoorcollege
Niveau	500

Inhoud vak

The course description is; available on

<http://studiegids.uva.nl/web/uva/sgs/en/c/132.html>

Doelgroep

mPhys-PPAP

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Particle Physics I

Vakcode	X_420052 (420052)
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H.J. Bulten
Niveau	400

Inhoud vak

The course description is available on <http://studiegids.uva.nl/web/uva/sgs/en/c/141.html>

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Particle Physics II

Vakcode	X_420053 (420053)
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H.J. Bulten
Niveau	500

Inhoud vak

The course description is available on; <http://studiegids.uva.nl/web/uva/sgs/en/c/142.html>

Doelgroep

mPhys-PPAP, mPhys-TP

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Particles and Fields

Vakcode	X_420112 (420112)
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Periode	Periode 4+5
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H.J. Bulten
Lesmethode(n)	Hoorcollege
Niveau	500

Inhoud vak

The course description is available on <http://studiegids.uva.nl/web/uva/sgs/en/c/2137.html> .

Doelgroep

mPhys-TP, mPhys-PPAP

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Photosynthesis and Energy

Vakcode	X_422553 (422553)
Periode	Periode 5
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. R. van Grondelle
Docent(en)	prof. dr. R. van Grondelle
Lesmethode(n)	Hoorcollege
Niveau	500

Doel vak

Introduce the fundamental aspects of photosynthesis and photosynthetic energy conversion.

Inhoud vak

Photosynthesis: an overview of the biological process
 The relevant structures: pigments, proteins, the photosynthetic membrane
 Excitation energy transfer and excitons
 Disorder Charge separation by the reaction center and electron transfer
 Charge stabilisation Proton coupled electron transfer
 The energetics of photosynthesis
 Artificial photosynthesis

Onderwijsvorm

Lectures, literature study, presentations

Toetsvorm

Scriptie plus presentation of subject related to photosynthesis.

Literatuur

Blankenship, R.E., Molecular Mechanisms of Photosynthesis. Blackwell 2002.

Doelgroep

mPhys-PLH, mPhys-AMEP, mCH-SES, mPhys-SES

Photovoltaics

Vakcode	X_428516 (428516)
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. ir. G.J.L. Wuite
Niveau	400

Inhoud vak

The course description is available on

<http://studiegids.uva.nl/web/uva/sgs/en/c/11041.html>

Doelgroep

mPhys-PPAPP, mPhys-TP, mPhys-AMEP

Overige informatie

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Physics of Anti-matter

Vakcode	X_428505 (428505)
Periode	Semester 2
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H.J. Bulten
Lesmethode(n)	Hoorcollege
Niveau	400

Inhoud vak

The course description is available on

<http://studiegids.uva.nl/web/uva/sgs/en/c/2147.html>

Doelgroep

mPys-PPAP (mPhys-TP)

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Physics of Organs 1: Cardio-Pulmonary Physics

Vakcode	X_428527 (428527)
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. ir. G.J.L. Wuite
Lesmethode(n)	Hoorcollege
Niveau	400

Inhoud vak

The course description is available on
<http://studiegids.uva.nl/web/uva/sgs/en/c/144.html>

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Physics of Organs 2: Sensory Organs and Bioelectricity

Vakcode	X_428528 (428528)
Periode	Semester 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege
Niveau	400

Inhoud vak

The course description is available via
<http://studiegids.uva.nl/web/uva/sgs/en/c/145.html>

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Policy, Politics and Participation

Vakcode	AM_470589 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen

Coördinator	prof. dr. J.T. de Cock Buning
Docent(en)	dr. B.J. Regeer, dr. J.F.H. Kupper, prof. dr. J.E.W. Broerse
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Doel vak

To further deepen your analytic skills with respect to the assessment of a specific societal problem;

To acquire further insight into the practice of interactive research;

To acquire further insights into specific methods and techniques of interactive research;

To strengthen the skills to design an interactive research project

To practice skills in data collection and analysis;

To learn to set up valid lines of argumentation;

To improve your communication skills;

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

Inhoud vak

In this course you get the chance to gain experience in the practical implementation of methodologies for interactive research. In a four week policy project you will both improve your focus group research skills and deepen your understanding of the relevant theoretical concepts in the areas of policy studies, science and technology studies and democracy theory. In a group of about ten students you will participate in a real interactive research project which is executed at the Athena institute. In this project you will be trained in and practice various skills for data collection (such as focus group design and facilitation) and data analysis (such as qualitative content analysis).

Specific attention is paid to your personal interactive research skills.

At the end of the course, you

prepare a policy report to present your findings. In an oral

presentation your team will highlight the main results of your analysis and defend the recommendations you propose.

Onderwijsvorm

Lectures, training workshops, project assignment

Toetsvorm

Individual evaluation based on personal performance in the project group and assessment of various group products (report and presentation). All parts need to be passed.

Literatuur

To be announced on Blackboard

Doelgroep

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

Overige informatie

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

Attendance is compulsory.

Praktijk I

Vakcode	O_MLPRAKI ()
Periode	Semester 1, Semester 2
Credits	15.0
Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek
Niveau	500

Doel vak

De student maakt kennis met het onderwijs in de praktijk, verzorgt lessen en is betrokken bij andere leerlinggerichte activiteiten. Hij kan binnen de context van de school theoretische inzichten praktisch vormgeven en weet de praktijkomgeving te benutten om aan eigen ontwikkelpunten te werken.

De student werkt samen met anderen binnen en buiten de school en kan zijn functioneren als teamlid beschrijven en toelichten.

Inhoud vak

Het totale aantal klassencontacturen dat een student moet maken tijdens Praktijk 1 en 2, bedraagt tenminste 250. Tijdens deze uren observeert of verzorgt de student lessen en neemt deel aan andere leerlinggerichte activiteiten. Hij/zij geeft tenminste 120 lessen, waarvan minimaal 40 lesuren in de bovenbouw havo/vwo.

De verdeling en fasering van dit aantal uren over Praktijk 1 en 2 wordt in overleg met de begeleider op school bepaald. In Praktijk 1 ligt de nadruk op het observeren en het onder begeleiding voorbereiden, uitvoeren en evalueren van lessen.

Dit opleidingsonderdeel loopt parallel aan vakdidactiek 1 en algemene didactiek en pedagogiek 1, waardoor een goede wisselwerking mogelijk is tussen theorie en praktijk.

Toetsvorm

Praktijk 1 wordt door de schoolbegeleider beoordeeld aan de hand van een checklist. De schoolbegeleider doet daarbij een voorstel dat door de instituutsbegeleider moet worden onderschreven.

Vereiste voorkennis

Dit vak is alleen te volgen als onderdeel van de universitaire lerarenopleiding

Praktijk II

Vakcode	O_MLPRAKII ()
Periode	Semester 1, Semester 2
Credits	15.0
Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek
Niveau	500

Doel vak

De student kan, als docent-in-opleiding, verantwoordelijkheid dragen voor het zelfstandig voorbereiden, uitvoeren en evalueren van lessen in de onder- en bovenbouw van het Havo/VWO. Hij kan tevens een bijdrage leveren aan schoolbrede activiteiten. Hij kan binnen de context van de school theoretische inzichten praktisch vormgeven en weet de praktijkomgeving te benutten om aan eigen ontwikkelpunten te werken. Hij kan reflecteren op opgedane ervaringen en verworven inzichten en deze op dusdanige manier beschrijven dat zij inzichtelijk worden voor anderen. De student toont zich professioneel in de samenwerking met anderen binnen en buiten de school en kan zijn functioneren als teamlid beschrijven en toelichten.

Inhoud vak

Het totale aantal klassencontacturen dat een student moet maken tijdens Praktijk 1 en 2, bedraagt tenminste 250. Tijdens deze uren observeert of verzorgt de student lessen en neemt deel aan andere leerlinggerichte activiteiten. Hij/zij geeft tenminste 120 lessen, waarvan minimaal 40 lessuren in de bovenbouw havo/vwo.

De verdeling en fasering van dit aantal uren over Praktijk 1 en 2 wordt in overleg met de begeleider op school bepaald. Tijdens Praktijk 2 draagt de student verantwoordelijkheid voor een of meer klassen. Hij bereidt het onderwijs voor, voert het uit en evalueert het. Hij werkt hierbij nadrukkelijk samen met sectiegenoten en andere collega's binnen de school en is zich bewust van de context waarin zijn lessen plaatsvinden. In het portfolio doet hij verslag van zijn functioneren als teamlid en collega in de school.

Dit opleidingsonderdeel loopt parallel aan vakdidactiek 2 en algemene didactiek en pedagogiek 2, waardoor een goede wisselwerking mogelijk is tussen theorie en praktijk.

Toetsvorm

Praktijk 2 wordt door de schoolbegeleider beoordeeld aan de hand van een checklist waarop het eindcijfer voor de praktijk wordt gebaseerd. De schoolbegeleider doet daarbij een voorstel dat door de instituutsbegeleider moet worden onderschreven.

Tevens beoordeelt schoolbegeleider het functioneren van de student als teamlid en collega op basis van de door de student uitgevoerde portfolio-opdrachten.

Vereiste voorkennis

Dit vak is alleen te volgen als onderdeel van de universitaire lerarenopleiding.

Principles of Pharmaceutical Sciences / Pharmacology

Vakcode	X_435675 (435675)
Periode	Periode 1
Credits	6.0
Voertaal	Engels

Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. I.J.P. de Esch
Docent(en)	prof. dr. N.P.E. Vermeulen, prof. dr. I.J.P. de Esch
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak

General introduction into and deepening of knowledge of concepts, mechanisms and recent developments in pharmaceutical sciences and the pharmaceutical and biotech industry.

Inhoud vak

This course is designed for students with an interest in life sciences and the biotech/pharmaceutical industry but without prior education in this field. A general introduction will be given to the process of drug discovery, drug design and synthesis, drug development and drug safety assessment. Subsequently, potential drug targets, mechanisms of drug actions (including drug-receptor/enzyme Using various drug classes, relationships between chemical structures and biological activities will be derived and illustrated. Finally, various modern developments and tools will be illustrated by recent applications in the field of drug research, medicinal chemistry and toxicology.

Onderwijsvorm

Lectures and tutorials.

Toetsvorm

Written examination, case studies and Blackboard assignments.

Literatuur

Patrick, G., An Introduction to Medicinal Chemistry 5th ed.
Oxford: Oxford University Press. 2009, ISBN: 978-0-19-969739-7

Doelgroep

3S, 3MNW, mCh, mPhys. The course is optional for mDDS students that did not follow the VU University BSc pharmaceutical sciences and these mDDS students should contact the mDDS coordinator before enrolling.

Professionele ontwikkeling en onderzoek I

Vakcode	O_MLVPOOI ()
Periode	Semester 1, Semester 2
Credits	3.0
Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek
Coördinator	ir. E.J.F. Scheringa
Docent(en)	drs. Y.G. Meindersma, dr. H.B. Westbroek, drs. H.R. Goudsmit, drs. I. Pauw, drs. S. Attema-Noordewier
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	500

Doel vak

De student kan systematische reflecteren op het eigen handelen in de onderwijspraktijk en daardoor richting geven aan de eigen professionele ontwikkeling.

De student kan een onderzoeksvraag formuleren voor een onderzoek aan zijn/haar eigen onderwijspraktijk, deze vraag inbedden in een theoretisch kader en een opzet maken voor de uitvoering van het onderzoek.

Inhoud vak

Dit vak bestaat uit twee delen: een reflectiedeel en een onderzoeksdeel. Het reflectiedeel krijgt vorm en inhoud in zogenaamde peergroepbijeenkomsten. Hierin reflecteert de studenten samen met anderen op zijn/haar handelen in de praktijk en leert daaruit ontwikkelpunten af te leiden, acties te formuleren en deze te evalueren. Verschillende instrumenten en methodes worden gebruikt (logboek, reflectiecirkel, intervisie,...) om de student in staat te stellen de complexiteit van de onderwijspraktijk te doorgronden en hiervan te leren.

In het onderzoeksdeel wordt een opzet gemaakt van een praktijkonderzoek. In dit onderzoek diept de student één of meer vraagstukken uit de (eigen) onderwijspraktijk uit, waarbij een onderzoeksvraag ingebed wordt in een theoretisch kader en op één of enkele scholen empirisch materiaal wordt verzameld. In plenaire bijeenkomsten komen onderwerpen aan de orde als het formuleren van de probleemstelling en de onderzoeksvraag, het verkennen van de literatuur en het verzamelen van de data. Daarnaast kan de student beroep doen op individuele begeleiding rondom zijn/haar onderzoek. Dit alles mondt uit in een eerste onderzoeksformat voor het praktijkonderzoek dat vervolgens in het vak Professionele Ontwikkeling en Onderzoek 2 uitgevoerd, gepresenteerd en geëvalueerd wordt.

Onderwijsvorm

colleges, werkgroepbijeenkomsten en individuele begeleiding van het onderzoek door instituutsbegeleiders.

Toetsvorm

Uitvoeren van opdrachten.

Literatuur

Een literatuurlijst wordt verstrekt aan het begin van de opleiding.

Vereiste voorkennis

Dit vak is alleen te volgen als onderdeel van de universitaire lerarenopleiding.

Overige informatie

Voor alle onderdelen geldt een aanwezigheidsplicht.

Professionele ontwikkeling en onderzoek II

Vakcode	O_MLVPOOII ()
Periode	Semester 1, Semester 2
Credits	6.0
Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek
Coördinator	dr. H.B. Westbroek

Docent(en)	dr. C.P. van Velzen, prof. dr. J.J. Beishuizen, drs. W. Jongejan, dr. H.B. Westbroek, dr. E. van den Berg, dr. J.J.M. van Eersel, W. Maas, drs. Y.G. Meindersma, drs. S. Attema-Noordewier, dr. T. Bosma, dr. A.A. Kaal
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	500

Doel vak

De student kan een praktijkonderzoek opzetten, uitvoeren en hierover rapporteren.

Inhoud vak

In het praktijkonderzoek diept de student één of meer vraagstukken uit de (eigen) onderwijspraktijk uit. Hij of zij doet dat door het opzetten, uitvoeren en evalueren van een op de eigen onderwijspraktijk gericht onderzoek waarbij op één of enkele scholen empirisch materiaal wordt verzameld. Aan de hand van de opzet die gemaakt is tijdens de module Professionele Ontwikkeling en Onderzoek 1 ontwerpt de student onderzoeksinstrumenten om empirisch gegevens te verzamelen voor het beantwoorden van de onderzoeksvraag en voert hij/zij het onderzoek uit. In een artikel voor een vaktijdschrift voor leraren rapporteert hij/zij over het onderzoek waarin aan de orde komen vraagstelling, relevantie, verankering in bestaande theorie, gebruikte instrumenten, data, conclusie en discussie. De student presenteert ook zijn/haar onderzoek tijdens de Onderwijsresearchdag.

Onderwijsvorm

Onderzoek, verplichte deelname aan colleges praktijkonderzoek, werkgroepbijeenkomsten, individuele begeleiding door instituutsbegeleiders.

Toetsvorm

De rapportage van het praktijkonderzoek vindt plaats in de vorm van een posterpresentatie en een artikel voor een vaktijdschrift voor leraren.

Het artikel wordt gezamenlijk beoordeeld door de eerste begeleider en tweede lezer, die wordt aangezocht door de eerste begeleider. De presentatie van het onderzoek op de Onderwijsresearchdag wordt meegenomen in de eindbeoordeling. Ook de mate van zelfstandigheid in het opzetten, uitvoeren en rapporteren van het onderzoek wordt beoordeeld

Literatuur

Een literatuurlijst wordt verstrekt aan het begin van de opleiding.

Vereiste voorkennis

Dit vak is alleen te volgen als onderdeel van de universitaire lerarenopleiding.

Om dit vak te volgen moet het vak Professionele Ontwikkeling en Onderzoek 1 met goed gevolg zijn afgelegd.

Overige informatie

Voor alle onderdelen geldt een aanwezigheidsplicht.

Programming C++

Vakcode	X_420141 (420141)
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Periode	Periode 3
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H.J. Bulten
Niveau	400

Inhoud vak

The course description is available on
<http://studiegids.uva.nl/web/uva/sgs/en/c/163.html>

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Project Sustainable Future

Vakcode	X_432784 ()
Periode	Periode 6
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.T.M. Kennis
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	500

Inhoud vak

Human civilization finds itself at a pivotal point in history. As a result of the growing world population as well as extensive industrial and societal developments that have taken place over the last 150 years, humanity has exploited earth's natural resources up to a point that further developing or even maintaining current levels of prosperity cannot be sustained. In addition, it has become very clear that current fossil fuel based energy technologies have a dramatic adverse effect on the global climate. These issues becomes even more urgent when considering the anticipated elevated prosperity levels in the developing world.

These developments lie at the basis of the concept of 'sustainability': the future has to be radically different from past and present in the sense that human activities must be carried out in such a way that they can be sustained for many generations. To achieve this, many aspects of human activity have to be changed: different technologies for energy production and resource utilization will have to be developed. Choices will have to be made as of which of these new technologies are considered most favorable for society. Such technologies will have to be implemented at large scale, which requires involvement of decisive societal forces, such as governments, markets, producers and consumers. Only if clear, rational and appealing visions are developed can such societal forces be activated and the required changes be realized.

In this course, we will consider a number of acute sustainability themes that humanity faces today. The students' mission of this course will be to define under which conditions new technologies can make a meaningful contribution to a sustainable future of our society in a specific case study. The project will be divided in 4 discrete steps:

1. We will analyze the scientific basis of the issue under consideration. We will analyze the potential, but also the limitations of each technology.
2. We will analyze what 'sustainability' actually means. The term is often used in a loose and informal way. But 'sustainability' only becomes meaningful when it is made quantitative! We will apply these concepts to the chosen theme, and define the conditions that are required to make the new technologies deserve the label 'sustainable'.
3. To assess and potentially quantify the uncertainties and risks with regard to the different technology solutions, how these could affect society now and in the future (through applying scenario planning techniques).
4. We will integrate the knowledge and insights obtained from the above three approaches, to understand how they are interconnected and how they influence one another.

Onderwijsvorm

lectures, guest lectures, werkcolleges, group work, self study

Toetsvorm

written exam
project report
presentation of project report
literature exercise

Vereiste voorkennis

mCh-SES, mPhys-SES, mSBI

Doelgroep

mCh-SES, mPhys-SES

Qualitative and Quantitative Research Methods

Vakcode	AM_470582 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. J.F.H. Kupper
Docent(en)	dr. H. Wels, dr. B.J. Regeer, dr. J.F.H. Kupper, dr. ir. R. Hoopman
Lesmethode(n)	Hoorcollege, Werkgroep, Computerpracticum
Niveau	400

Doel vak

Understanding the differences between beta- and gamma research
To acquire insight and understanding of a transdisciplinary research process. This includes knowledge of the character of and need for transdisciplinary approaches, and their advantages and disadvantages

To acquire insight into various quantitative and qualitative research methods and their underlying theoretical concepts
To understand the relative strengths and weaknesses of the various research methods
To know how to interpret quantitative and qualitative findings
To acquire insight and understanding of the possibilities to integrate quantitative and qualitative research information
To be able to make an adequate transdisciplinary research design for the investigation of a specific problem.

Inhoud vak

Contemporary societies increasingly face complex social problems, like climate change, HIV/ AIDS or ethnic and religious diversity . These complex problems involve a variety of social actors: policy-makers, professionals, NGOs, industry, science and of course the public at large. Addressing such complex issues demands a transdisciplinary approach that investigates, analyzes and integrates the positions and knowledge of different actors. This course offers an (advanced) introduction to various research methods used in transdisciplinary research: questionnaires, systematic observations using all the senses, surveys and statistics, semi-structured in-depth interviews, as well as several interactive and participatory methods. These methods are commonly used in transdisciplinary research into complex problem contexts, communication, and opportunities for intervention. Strengths and weaknesses of each research method and technique will be discussed, as well as its possibility to be applied in different societal contexts. Throughout the course, you will apply theoretical knowledge about the various research methodologies in the training of different qualitative and quantitative methods, and in making a research design. In small groups, students are trained in: (1) qualitative research methods such as semi structured interviews and observation techniques, (2) quantitative research methods such as questionnaires, 3) analysis of the data, and (4) writing a transdisciplinary research design.

Onderwijsvorm

Lecture (20h), Training workshops (30h), Self-study (107h), Examination (3h).

Toetsvorm

Group assignment (50%) and exam (50%). Both parts need to be passed (6).

Literatuur

Announced on blackboard one month before course starts

Doelgroep

Compulsory course in the Master programme Management, Policy Analysis and Entrepreneurship for the Health and Life Sciences (MPA) and compulsory course within the Science communication- and Societal differentiations of Health, Life and Natural Sciences Masters programmes.

Overige informatie

Attendance of training workshops is compulsory. For further information please contact harry.wels@falw.vu.nl.

Quantum Field Theory

Vakcode	X_420081 (420081)
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Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. P.J.G. Mulders
Docent(en)	prof. dr. P.J.G. Mulders
Lesmethode(n)	Hoorcollege

Doel vak

Quantum field theory is indispensable as a basis to theoretical physics. Applications of quantum field theory can be found in statistical physics, solid state physics and subatomic physics. Also in the analysis of experiments, in particular in particle physics, insight in field-theoretical methods is of great importance.

Inhoud vak

The course aims to treat several of the basic aspects of quantum fields using examples that relate as closely as possible to contemporary interests in the various application areas. Among them:

- Poincare-group and relativistic equations of motion.
- Classical field theory, Lagrange formalism, symmetries, currents and conservation laws.
- Path integral formalism, quantization, Feynman diagrams.
- Gauge theories with applications in quantum electrodynamics.
- Reaction cross sections and decay processes.
- Introduction to nonabelian gauge theories and the standard model.

Onderwijsvorm

Active participation in lectures and exercise sessions, handing in exercises and final examination (depending on the number of participants this will be an oral or written examination).

Toetsvorm

Active participation in lectures and exercise sessions, handing in exercises and final examination (depending on the number of participants this will be an oral or written examination)

Literatuur

Lecture notes will be made available.

Useful books are:

- Srednicki, M., Quantum Field Theory. Cambridge University Press.
- Ryder, L.H., Quantum Field Theory, Cambridge University Press.
- Peskin, M.E., and Schroeder, D.V., Quantum Field Theory. Addison Wesley.

Aanbevolen voorkennis

Advanced Quantum Mechanics (VU) or Quantum 3 (UvA).

Doelgroep

mPhys-PPAP, mPhys-TP

Overige informatie

This course can be extended with 3 credit points (code 422554) in period 3 (January).

In 2013 - 2014 this course will be given at UvA by Alejandra Castro.

Quantum Field Theory - Extension

Vakcode	X_422554 (422554)
Periode	Periode 3
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Docent(en)	prof. dr. P.J.G. Mulders
Lesmethode(n)	Hoorcollege
Niveau	500

Inhoud vak

see: Quantum Field Theory (X_420081)

Overige informatie

In 2013 - 2014 this course will be given at UvA by Alejandra Castro.

Coordinator: dr. A. Castro Anich

Quantum optics

Vakcode	X_428535 ()
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

The course description is available on

<http://studiegids.uva.nl/web/uva/sgs/nl/c/2128.html>

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

SBI Project & Master Thesis

Vakcode	X_432735 ()
Periode	Ac. Jaar (september)
Credits	36.0
Voertaal	Nederlands
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. ir. B.A.G. Bossink
Lesmethode(n)	Hoorcollege
Niveau	600

Science and Communication

Vakcode	AM_470587 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. B.J. Regeer
Docent(en)	dr. B.J. Regeer, dr. J.F.H. Kupper, T. de Lange MSc, B.M. Tielemans
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Doel vak

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

Inhoud vak

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

Onderwijsvorm

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

Toetsvorm

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

Literatuur

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

Doelgroep

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

Overige informatie

Guest lecturers amongst others:

A. van der Plas (TNO)

F. van Dam (CSG, Centre for Society and the Life Sciences)

Science in Dialogue

Vakcode	AM_1002 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. J.F.H. Kupper
Docent(en)	dr. J.F.H. Kupper
Lesmethode(n)	Werkgroep, Hoorcollege
Niveau	500

Doel vak

To gain knowledge and insight into:

- the basic concepts and issues in the understanding of science-society interactions, both from a philosophical and communication science perspective
- the nature and course of interpersonal and group communication processes relevant to the formal and informal dialogue between science and society
- the nature and form of dialogical science communication, aimed at mutual understanding and learning

To acquire or improve:

- the individual student's skills for effective interpersonal communication
- the individual student's skills for the design and facilitation of the science-society dialogue

Inhoud vak

This course examines the public character of scientific controversy and focuses on the communicative aspects of a fruitful science-society dialogue. At the dawn of the 21st century, science, and particularly fields that combine science and engineering such as nanotechnology and synthetic biology, holds a great promise for the progress of our societies. At the same time, these developments are controversial. They

lead to a variety of concerns related to risks, benefits and wider moral issues. Nanotechnology creates materials with novel characteristics that help us, but may also contain risks for health and environment.

Synthetic biology develops new biological systems that may be very useful, but radically change the nature and meaning of life. Clearly, advances in science do not always match the needs, desires and expectations of society. On the other hand, parts of society might not always appreciate the nature and scope of scientific findings. For a fruitful relationship between science and society, a constructive science-society dialogue is necessary.

This course offers advanced lectures on the basic concepts and issues of dialogical science communication: communication, learning, dialogue, understanding, controversy, democracy. A series of workshops and small group assignments presents communicative tools and spaces such as discussion games, science theatre and multimedia platforms that can be used to design and facilitate science-society interactions. Training workshops will focus on improving the students' individual communication and facilitation skills. The students' individual learning curve as a science communicator and facilitator is monitored by means of a personal development plan. The course is completed with an individual essay assignment about the sense and nonsense of the science-society dialogue.

Onderwijsvorm

Lectures (14h), Workgroups (28h), Training workshops (24h), Selfstudy, (82h), Dialogue presentations (12h)

Toetsvorm

Group assignment (50%), Take home exam (30%), Mini portfolio (20%)

Literatuur

Is announced on blackboard one month before start of the course

Doelgroep

Optional course in the MSc specialization Science Communication

Overige informatie

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

Science in Perspective

Vakcode	X_437030 ()
Periode	Periode 4+5
Credits	6.0
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

<http://studiegids.uva.nl/web/uva/sgs/nl/c/9061.html>

Doelgroep

mCh, mPhys

Overige informatie

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Science Journalism

Vakcode	AM_471014 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. J.F.H. Kupper
Docent(en)	dr. J.F.H. Kupper, W.J. Breukers MSc, dr. M.J.W. Bos
Lesmethode(n)	Hoorcollege, Werkgroep, Computerpracticum
Niveau	500

Doel vak

To acquire knowledge and insight into:

- the popularization of natural scientific knowledge and the use of different media
- the criteria for effective science journalism with respect to diverse media
- the role of science journalists in the debate about knowledge in society

To acquire skills in:

- writing popular scientific texts for different genres such as news, background and interview
- designing science communication for different media such as newspaper, radio and internet

Orientation to the professional practice of science journalism

Inhoud vak

This course teaches the basic principles of science journalism. A series of interactive lectures reviews both the practical as well as the theoretical aspects of science journalism. Topics that are discussed are the translation of science to a language that is both compelling and understandable, the role of journalism in the interaction between science and society, images of science in the media and the ethics of science journalism. The interactive lectures invite you to take your own defensible position with regard to these issues.

Guest lectures provide insight into the professional practice of science journalists. The guest speakers work as freelancer, editor or producer at diverse science media, such as newspapers (NRC, Volkskrant), magazines (NWT), internet (Noorderlicht) and radio (Labyrint).

Finally, the course trains specific skills that you need as a science journalist, such as popular writing, interviewing, conceptual analysis and program design.

Onderwijsvorm

Lectures and seminars on theory and practice of science journalism and writing skill training (36h). Considerable time is set aside for performing science journalism in assignments (108h). The assignments are assessed by lecturers and fellow students (peer-review process). Self study (16h).

Toetsvorm

Individual exam (20%), Individual Assignments (50%, Small Group Assignments (30%)

Literatuur

Announced on Blackboard one month before start of the course

Doelgroep

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

Overige informatie

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

Science Museology

Vakcode	AM_470590 ()
Periode	Periode 3
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. B.J. Regeer
Docent(en)	dr. B.J. Regeer, drs. ir. M.G. van der Meij, T. de Lange MSc
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Doel vak

- Gain insight in the role of museum exhibits in the field of science communication.
- Apply theoretical notions of science communication and science education, to conduct science communication research in museum settings.
- Apply qualitative and quantitative research methods to design, conduct, and report on a research project in museum settings.
- Apply theoretical notions of science communication, science education and exhibit design to advise on adjustments and/or development of exhibitions.

Inhoud vak

This course is about the role of science museums/centers, zoos and natural history museums in science communication. You will get familiar with theories of science communication and informal science education in museum setting, and will be introduced to different educational methods as well as styles of communication, different approaches to exhibit design & development, and different methods of research and evaluation of exhibitions.

Guest speakers give insight into their profession (1) as science communicators in museums and science centers, (2) as researchers in the field of museology, and/or (3) as professionals in developing informal science & technology learning programs.

Through several assignments you are encouraged to combine theory and practice, working step-by-step towards (part of) an exhibition (re-) design. The assignments come from museums and science centers, such as NEMO, Museum, Naturalis, Delft Science Centre, and Artis.

Onderwijsvorm

Lectures (14 h)
Workgroups (40 h)
Home-study for group assignments (64 h)
Home-study for individual assignments (32 h)

Toetsvorm

Group assignment (40%), presentations (poster and oral) (10%), and exams (take-home and written) (50%). For all the assignment, presentations and all exams a pass-grade must be obtained.

Literatuur

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

Vereiste voorkennis

Bachelor in any of the Beta Sciences

Doelgroep

Optional course in the C-differentiations (Science Communication) of most of the two-year master programs of the FALW and FEW faculties. Master students from other universities in any scientific field are welcome as well.

Overige informatie

Guest lecturers:
E. Hamstra (Northernlight)
C. Vermeulen (Artis)
M. van der Meer (Delft Science Centre)
I. van Zeeland (Naturalis)
And possibly additional guest lecturers from NEMO, Boijmans van Beuningen, Museon, Van Gogh Museum, etc.

Science Project Energy

Vakcode	X_432736 ()
Periode	Ac. Jaar (september)
Credits	24.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.C. Slotweg
Niveau	400

Doel vak

The MSc SBI students will follow the science project energy or the science project life to strengthen their background knowledge in natural sciences in order to be able to talk the language of the specialists and to scan and interpret new developments and inventions in the field of life sciences and energy and sustainability.

Inhoud vak

The science projects energy are based on a Life Cycle Analysis, in this case of current or future energy technologies, with focus on the technological and environmental aspects. In order to assess if a certain energy technology can be regarded as durable, reliable and

scientifically justified estimations are needed of aspects like yield and net CO₂ release. Both the Chemistry and Physics perspective are essential in these projects. The students will be guided through the following aspects of a certain energy technology to come to a critical assessment:

- Literature search
- Defining gaps
- Defining experiments to clear gaps
- Defining required research skills
- Execution of experiments
- Interpretation and conclusion
- Reporting and/or publishing

Toetsvorm

Research project.

Literatuur

Depending on the project.

Vereiste voorkennis

BSc-SBI courses Materialen/Duurzame Chemie, Duurzame Energie, Innovatieproject Energie, Innovatieproject Alternatieve Brandstoffen

Aanbevolen voorkennis

BSc-SBI courses Materialen/Duurzame Chemie, Duurzame Energie, Innovatieproject Energie, Innovatieproject Alternatieve Brandstoffen.

Doelgroep

mCh-SBI, mPhys-SBI

Scientific Writing in English

Vakcode	X_400592 (400592)
Periode	Periode 2, Periode 6
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	M. van den Hoorn
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	400

Doel vak

The aim of this course is to provide the writing student with the essential linguistic means for producing English academic texts which are effective, idiomatically and stylistically appropriate and grammatically correct.

Inhoud vak

The initial focus in the course lies on the form of scientific texts in the Exact Sciences:

- Abstract (or summary)
- Introduction
- Methods
- Results
- Discussion

General course outline

Introducing the topics

- Academic and technical writing in English
- The characteristics of different kinds of scientific texts
- How scientific writing is judged and assessed
- Where do you find your information and how do you present it?
- How to avoid committing plagiarism

Who am I writing for? What do I want to say?

- Your readership
- Key parts of an academic article: title, abstract, introduction, methods, results and discussion

Writing the actual article

- Paragraph and sentence construction: how do I link paragraphs together?
- Writing simple and complex sentences. Active and passive sentences.
- Argumentation : how do I put an argument? How do I frame my own opinion?

Should I use "I" or "we"?

Writing correct English

- Use of apostrophes and colons
- Word order, verb tenses, time and tense
- Avoiding mistakes typically made by Dutch writers
- Common spelling mistakes

You will be making considerable use of peer assessment: examining fellow students' written work and giving them feedback. This method provides useful insights into how a text might be improved. The process of providing someone else with feedback on their text is something that you will find very instructive.

Onderwijsvorm

The course is focused on self-tuition. The plenary sessions concentrate on the process of writing and the product of writing. Homework is part of the course. With each topic, participants work through a phased series of exercises that usually conclude with the requirement to write a short piece of text. The instructor will append extensive written remarks to this text.

Toetsvorm

There will be no examination. However, students will receive their credits only when they have participated in all classes (presence is obligatory) and also when they have handed in the assignments satisfactorily. Students will receive a 'pass' when they have finished the course.

Literatuur

For this course you need the book *Effective Scientific Writing: an advanced learner's guide to better English* (A. Bolt & W. Bruins, ISBN 978 90 8659 6171). This book can be obtained at the VU bookstore, which is located in the VU main building. The costs are € 27,95 per book. For questions contact the Taalcentrum-VU at 020 - 598 9804.

Vereiste voorkennis

Bachelor Exact Sciences

Doelgroep

Optional for mAI, mCS, mIS, mBIO, mPDCS, mCh, mDDS, mPhys.

Soft Condensed Matter and Biological Physics

Vakcode	X_420167 (420167)
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. ir. G.J.L. Wuite
Docent(en)	prof. dr. ir. G.J.L. Wuite
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak

To provide insight into the physics of biological systems and soft condensed matter. In addition we will discuss and illustrate recent examples of the scientific literature in this field.

Inhoud vak

- The building blocks of cells.
- Statistical physics applied to soft-condensed matter.
- Random Walks, Friction and Diffusion.
- Life at low Reynolds number.
- Entropic forces at work.
- Chemical forces & self-assembly.
- The cytoskeleton, a semiflexible, crosslinked polymer network.
- Enzymes and molecular machines.
- Molecular motor proteins, the lorries in our cells.

Onderwijsvorm

Lectures, and self-study.

Toetsvorm

Homework, Scientific literature presentations and an exam.

Literatuur

Nelson, P., Biological Physics, Energy, Information, Life. New York: W.H. Freeman and Company, 2004 (ISBN 0-7167-4372-8).

Doelgroep

mMNS, mPhys-AMEP, mPhys-PLH

Speciale Relativiteitstheorie

Vakcode	X_422534 (422534)
Periode	Ac. Jaar (september)
Credits	1.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. K.S.E. Eikema
Niveau	500

Doel vak

Doelstelling van het college Speciale Relativiteitstheorie is de basiskennis van de speciale relativiteitstheorie op te doen, benodigd voor goed functioneren als eerste graads natuurkundedocent in het voortgezet onderwijs.

Inhoud vak

In het college komen de volgende onderwerpen aan de orde:

- Galileische-Newtoniaanse relativiteit
- Het Michelson-Morley experiment
- Postulaten van de speciale relativiteitstheorie
- Simultaanheid
- Tijdsdilatatie en de tweeling paradox
- Lengtecontractie
- Galileische en Lorentz transformaties
- Relativistische impuls en massa
- Massa en energie
- Dopplerverschuiving voor licht
- Implicaties van de speciale relativiteitstheorie

Onderwijsvorm

In alle periodes als zelfstudie, uitgezonderd aan het eind van periode 2; dan kan als alternatief de colleges gevolgd worden die een onderdeel zijn van het vak "Mechanica en Speciale Relativiteitstheorie".

Toetsvorm

Mondeling tentamen.

Literatuur

Giancoli, Douglas C., Physics for Scientists and Engineers with Modern Physics, Fourth edition, Prentice Hall, Upper Saddle River, New Jersey 07458, USA.

Doelgroep

Dit vak kan alleen gekozen worden door studenten van de lerarenopleiding om een vakdeficientie weg te werken, niet door natuurkunde studenten of andere geïnteresseerden.

Overige informatie

Neem contact op met de docent voor de exacte data van de colleges en tentamen (k.s.e.eikema@vu.nl)

Statistical Data Analysis

Vakcode	X_420067 (420067)
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

The course description is available on

<http://studiegids.uva.nl/web/uva/sgs/en/c/133.html>

Doelgroep
mPhys-PPAP

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Statistical Mechanics of Soft Matter

Vakcode	X_422555 (422555)
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. F.C. Mac Kintosh
Docent(en)	prof. dr. F.C. Mac Kintosh
Lesmethode(n)	Hoorcollege
Niveau	400

Inhoud vak

In this course, we begin with an introduction/review of the fundamentals of statistical mechanics. We then develop quantitative approaches to understand fluctuations of systems about thermal equilibrium, as well as the linear response of such systems to external perturbations. These techniques are particularly relevant to soft matter systems, which tend to exhibit strong thermal fluctuations and high sensitivity to external forces/fields. We also introduce and develop theoretical approaches to understand phase transitions and critical phenomena.

Doelgroep

mPhys-MP, mPhys-PAP, mPhys-TP

Statistical Physics and Condensed Matter Theory I

Vakcode	X_420083 (420083)
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

The course description is available on <http://studiegids.uva.nl/web/uva/sgs/en/c/135.html>

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Statistical Physics and Condensed Matter Theory II

Vakcode	X_420100 (420100)
Periode	Semester 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege
Niveau	500

Inhoud vak

The course description is available on <http://studiegids.uva.nl/web/uva/sgs/en/c/136.html>

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Statistical Physics and Condensed Matter Theory II - Extension

Vakcode	X_428519 (428519)
Periode	Periode 3
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	500

Inhoud vak

The course description is available on <http://studiegids.uva.nl/web/uva/sgs/nl/c/135.html>

Doelgroep

mPhys-TP

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Statistical Theory of Complex Molecular Systems

Vakcode	X_428520 (428520)
Periode	Periode 1

Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

The course description is available on

<http://studiegids.uva.nl/web/uva/sgs/nl/c/10917.html>

Doelgroep

mMNS-PoL, mPhys-LSBP, mPhys-PLH, mCh-MSP

Overige informatie

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

String Theory

Vakcode	X_400242 (400242)
Periode	Semester 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege
Niveau	500

Inhoud vak

The course description is available on:

<http://studiegids.uva.nl/web/uva/sgs/en/c/166.html>

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Strong Interactions 1

Vakcode	X_420233 (420233)
Periode	Periode 4
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege
Niveau	400

Inhoud vak

The course description is available on

<http://studiegids.uva.nl/web/uva/sgs/en/c/9638.html>

Doelgroep

mPhys-PPAP, mPhys-TP

Overige informatie

This course is scheduled in the first block of semester 2 at the University of Utrecht, room to be announced.

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Strong Interactions 2

Vakcode	X_420234 (420234)
Periode	Periode 5
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege
Niveau	500

Inhoud vak

Course description is available on <http://studiegids.uva.nl/web/uva/sgs/en/c/9639.html> .

Doelgroep

mPhys-PPAP, mPhys-TP

Overige informatie

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

Location: Utrecht

Student Seminar Theoretical Physics

Vakcode	X_420200 (420200)
Periode	Semester 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. F.C. Mac Kintosh
Lesmethode(n)	Hoorcollege
Niveau	500

Inhoud vak

The course description is available on <http://studiegids.uva.nl/web/uva/sgs/en/c/125.html>

Overige informatie

Student Seminar Theoretical Physics: wordt in 2013-2014 gegeven door Sebastian de Haro (AUC/UvA)

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Summer-school AMEP

Vakcode	X_428521 (428521)
Periode	Semester 2
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege
Niveau	500

Inhoud vak

The course description is; available on <http://studiegids.uva.nl/web/uva/sgs/en/c/11056.html>

Doelgroep

mPhys-AMEP

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Superconductivity

Vakcode	X_428522 (428522)
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege
Niveau	500

Inhoud vak

The course description is; available on <http://studiegids.uva.nl/web/uva/sgs/en/c/11048.html>

Doelgroep

mPhys-TP, mPhys-AMEP

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Survival Guide for Scientists

Vakcode	X_428523 (428523)
Periode	Periode 6
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege
Niveau	400

Inhoud vak

The course description is; available on <http://studiegids.uva.nl/web/uva/sgs/en/c/11058.html>

Doelgroep

mPhys, mCH

Overige informatie

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Transdisciplinarity and Transition

Vakcode	X_430604 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. J.T. de Cock Buning
Docent(en)	prof. dr. J.T. de Cock Buning
Lesmethode(n)	Hoorcollege, Werkcollege, Deeltoets extra zaalcapaciteit
Niveau	400

Doel vak

- You can reproduce the essence of the current transition theories, e.g., Multi level perspective theories.
- You can design a taylor made transdisciplinary approach to identify and cope with hurdles in an innovation trajectory, e.g., Interactive Learning and Action approach,
- You are able to make an in-depth semi-structured interview guide.
- You are able to execute and transcribe/analyze/summarize an interview
- You are able to apply analytical tools (causal analysis, actor analysis, fact-value framing), SWOT.

- You are able to integrate multidisciplinary knowledge and multi-stakeholder interests into a management advice for a transition processes

Inhoud vak

Innovation often implies a troublesome and risky process starting with a bright idea, via a small niche innovation towards a competitive position. This course will focus on the analytical skills necessary to guide or advice a niche innovation.

Guiding and advising implies that you are aware of the social forces prohibiting a breakthrough and how to identify tailor made solutions to deal with these forces. Therefore, this course introduces you into the current theories related to innovation and societal forces, the so called multi level theories, and we will offer you training with a toolbox of various analytical methods to explore the specific hurdles of a given project, in order to design a tailor made advice.

Little by little academic research reveals the complexity of societal mechanisms behind transitions, e.g., cultural aspects, psychological aspects, structures of states, institutions and multinationals.

Transdisciplinary is an emerging discipline in which research approaches and analytical methods are developed to connect relevant parts of different disciplines to solve complex processes such as transitions. Complex because: there are different stakeholders involved from industry, academia, consumers and NGO's; within academia there are beta disciplines and gamma disciplines involved who do not share a same vocabulary and methodologies, nor visions what is "best" for society..

On the base with our in house experiences with large innovative consortia (Genomic Initiative/ ecological genomics, Sustainable innovation/brain imaging, Be-basic/synthetic biology) you will learn all about the do's and don'ts of Interactive learning approach, actor analysis to delineate you allies and enemies, the semi-structured interviews to deepen your understanding of reasons for problems to meet, causal analysis to understand the complexity of the problems you face, and SWOT analysis to arrive at strategic priorities.

Parallel to the lectures you will work with a team on an advice regarding an innovation, scheduling interviews with key players and analyze the complexity of interests

Onderwijsvorm

Lectures, self-study, response lectures and case study. In the case study, you'll practice integrating theories and tools, and applying the toolbox

Toetsvorm

Exam (30%)

Essay containing a summary of the relevant elements of the Literature (30%).

Attitude and skills assessment (20%).

Case study 20%

Exam must be pasted

Literatuur

Book: Biotechnology and Food (sold at the start)

Doelgroep

Optional course for students SBI track (mCh)

Overige informatie

Proven knowledge of organizations and management and business is required

Tutoring Students

Vakcode	X_432625 (432625)
Periode	Periode 2
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. M. Wijtmans
Examinator	dr. M. Wijtmans
Docent(en)	dr. E.M.M. van Rens
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak

This course aims to prepare students for coaching tasks in tutorials and practical courses. Students will encounter aspects of teacher-student interaction, including several models that are involved in the coaching process.

Inhoud vak

The course contains various topics and activities. Students make an analysis of various learning aims as well as prepare, conduct and reflect on a presentation of a pre and post discussion regarding tutorials and practical courses. They will observe and interpret the application of problem solving and coaching models in tutorials and practical courses. Attention will be paid to strengths and weaknesses in models of teacher-student interaction. An important constituent is the student's analysis of his/her own pattern of communication. Topics on safety and lab journal procedures in practical courses as well as on the grading of lab reports are also included.

Onderwijsvorm

4 consecutive hours per week (seven weeks long):

- Lectures
- Simulations
- Self-study
- Group work

Toetsvorm

- An essay on the strengths and weaknesses in a model of teacher-student interaction.
- A learning report on presentations concerning predict, observe, explain in practical work.
- A written analysis on grading lab reports.
- A written feedback on the planning of and enactment in tutorials.

Literatuur

Will be provided.

Doelgroep

mCh-AS, mCh-MDSC, mCh-MSP, mCh-SES, mDDS-BCCA, mDDS-CMCT, mDDS-DD&S, mDDS-DDSA, mDDS-DDTF

Intekenprocedure

VUnet

Overige informatie

This course is compulsory for MSc students who become assistants in practical courses and tutorials in the department of Chemistry and Pharmaceutical Sciences. Moreover, the course is recommendable to any MSc student who has a general interest in educational coaching strategies and models.

Number of participants is limited to 24 (first-come, first-serve basis).

Priority is given to MSc students. If any of the 24 seats are left, the course may also be accessible to 3rd year BSc students FAR en SK with a strong interest in educational aspects (first-come, first-serve basis).

Interested BSc students should first contact Maikel Wijtmans

(m.wijtmans@vu.nl).

Ultrafast Laser Physics

Vakcode	X_422556 (422556)
Periode	Periode 5
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. K.S.E. Eikema
Docent(en)	prof. dr. K.S.E. Eikema
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak

To provide a broad overview of both the ultrafast techniques and phenomena in physics and chemistry.

Inhoud vak

This course covers both the principles behind ultrafast optical pulse generation and control, and its applications in physics and chemistry. After a review of basic femtosecond laser techniques, the interaction of light with matter in the linear and nonlinear regime will be discussed. This includes the concepts of dispersion (in 1st and higher order) and pulse propagation effects, nonlinear processes such as second-harmonic generation, parametric amplification, stimulated Raman scattering, photon echos. Also pump-probe and transient spectroscopy will be discussed. Other topics that will be covered are pulse measurement techniques such as FROG and SPIDER, femtosecond frequency combs, spectrum extension methods such as continuum, THz and X-ray generation, attosecond physics, spectral and temporal shaping of pulses, including applications such as coherent control. These concepts will be illustrated using applications in physics and chemistry.

Onderwijsvorm

Lectures with excersices and demonstrations (excursions to the lab).

Toetsvorm

Written exam.

Literatuur

Book "Ultrashort Laser Pulse Phenomena" by J-C Diels and W. Rudolph, 2nd edition (2005), ISBN 978-0-12-215493-5, and possibly lecture notes.

Aanbevolen voorkennis

Some background in optics and electrodynamics is required.

Doelgroep

Master students physics.

Ultrafast X-ray Physics

Vakcode	X_428524 (428524)
Periode	Semester 2
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege
Niveau	400

Inhoud vak

The course description is; available on

<http://studiegids.uva.nl/web/uva/sgs/en/c/11061.html>

Overige informatie

Opgave via <https://www.sis.uva.nl> tot 4 weken voor aanvang van het semester is verplicht

Course registration at the UVA is compulsory at least 4 weeks before the start of the semester via <https://www.sis.uva.nl>

Vakdidactiek Natuurkunde I

Vakcode	O_MLVDNAI ()
Periode	Semester 1, Semester 2
Credits	3.0
Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek
Lesmethode(n)	Werkcollege
Niveau	500

Doel vak

De student kan vakinhoudelijke en vakdidactische kennis, vaardigheden en inzichten vertalen naar de eigen vaklessen.

Inhoud vak

Tijdens de vakdidactiekcolleges maakt de student kennis met de inhoud en didactiek van het schoolvak en leert deze inzichten in de praktijk vorm te geven. Er is aandacht voor vakspecifieke kennis en vaardigheden en de voor het schoolvak relevante ICT-toepassingen. In het vakdidactiekprogramma vindt eveneens een vertaling plaats van algemeen didactische thema's naar het vak. De leservaringen op school spelen hierbij een belangrijke rol.

Onderwijsvorm

Werkcolleges

Toetsvorm

Beoordeling van het portfolio

Literatuur

Een literatuurlijst wordt verstrekt aan het begin van de opleiding

Vereiste voorkennis

Dit vak is alleen te volgen als onderdeel van de universitaire lerarenopleiding

Overige informatie

Er geldt een aanwezigheidsplicht

Vakdidactiek Natuurkunde II

Vakcode	O_MLVDNAII ()
Periode	Semester 1, Semester 2
Credits	6.0
Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek
Lesmethode(n)	Werkcollege
Niveau	500

Doel vak

De student kan vakinhoudelijke en vakdidactische kennis, vaardigheden en inzichten vertalen naar de eigen vaklessen en zijn aanpak verantwoorden.

Inhoud vak

De tijdens Vakdidactiek 1 opgedane kennis en vaardigheden worden in Vakdidactiek 2 verder uitgebreid en verdiept. In dit semester ligt het accent op het zelfstandig vormgeven van een samenhangende lessenserie gericht op de bovenbouw van het Voortgezet Onderwijs, die inhoudelijk en vakdidactisch verantwoord moet worden.

Onderwijsvorm

Werkcolleges

Toetsvorm

Beoordeling van het portfolio

Literatuur

Een literatuurlijst wordt verstrekt aan het begin van de opleiding

Vereiste voorkennis

Dit vak is alleen te volgen als onderdeel van de universitaire lerarenopleiding

Reguliere studenten dienen eerst Vakdidactiek 1 afgerond te hebben alvorens aan Vakdidactiek 2 kan worden deelgenomen. Voor instromers (studenten met een tweedegraads bevoegdheid en een master in het Schoolvak) geldt deze verplichting niet.

Overige informatie

Er geldt een aanwezigheidsplicht

Verdieping

Vakcode	O_MLVERD ()
Periode	Semester 1, Semester 2
Credits	3.0
Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek
Coördinator	dr. J.J.M. van Eersel
Docent(en)	drs. H.R. Goudsmit, dr. J.J.M. van Eersel
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	500

Doel vak

De student verdiept zich op een onderdeel binnen zijn schoolvak of cluster.

De student is zich bewust van zijn rol als docent in een multiculturele samenleving.

De student kan de verschillende aspecten van diversiteit en multiculturaliteit in het onderwijs benoemen en aangeven hoeverre deze aspecten in zijn of haar eigen schoolpraktijk een rol spelen.

Inhoud vak

Binnen de clusters en vakken worden (verplichte) verdiepingsmodulen aangeboden. Daarnaast volgt elke student het onderdeel multiculturaliteit, waarin een aantal aspecten van onderwijs voor een multiculturele samenleving aan de orde komen:

1. Wat betekent identiteitontwikkeling in het kader van een multiculturele samenleving?
2. Wat is de zin en onzin van intercultureel onderwijs?
3. Wat zijn de verschillende thematieken van diversiteit en multiculturaliteit in de klas?
4. Wat is er bekend uit onderzoek over diversiteit, cultuur, etniciteit in de onderwijspraktijk?

Onderwijsvorm

Hoorcollege, werkcollege.

Toetsvorm

Bespreking van een casus.

Literatuur

Wetenschapscommunicatie voor Bèta-onderzoekers

Vakcode	AB_470185 ()
Periode	Periode 5
Credits	6.0
Voertaal	Nederlands
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. J.F.H. Kupper
Docent(en)	dr. B.J. Regeer, dr. J.F.H. Kupper, C.A.C.M. Pittens MSc, drs. ir. M.G. van der Meij, R.C. van Koten MSc
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	200

Doel vak

- Introductie in het vakgebied wetenschapscommunicatie
- Verwerven van kennis en inzicht in de dynamische relatie tussen wetenschap en maatschappij
- Verwerven van inzicht in verschillende belangen en perspectieven van betrokken partijen in wetenschapscommunicatie
- Verwerven van inzicht in de rol van wetenschapscommunicatie in de relatie tussen wetenschap en maatschappij
- Verwerven van inzicht in communicatiestrategieën, doelgroepen en media in wetenschapscommunicatie
- Ontwikkeling van praktische vaardigheden voor wetenschapscommunicatie (schrijven, presenteren, discussiëren)
- Het opdoen van ervaring in een multidisciplinaire groep.

Inhoud vak

Wetenschap heeft verstrekkende gevolgen voor de maatschappij (bv. biotechnologie, neurowetenschappen, farmaceutische industrie). Maar hoe kijkt de maatschappij eigenlijk naar wetenschappelijke ontwikkelingen? Wat vindt de industrie van nieuwe wetenschappelijke inzichten? Hoe reageren maatschappelijke organisaties of het brede publiek? Deze maatschappelijke visies hebben een grote invloed op de richting die het onderzoek in de nabije toekomst gaat nemen. Daarom is communicatie over wetenschap van cruciaal belang.

In deze cursus raak je vertrouwt met een aantal modellen van wetenschapscommunicatie, het herkennen van hun toepassingen in de praktijk en de verschillende soorten publiek die men ermee kan aanspreken (populariseren voor leken, informatieoverdracht voor de industrie, faciliteren van interdisciplinair onderzoek in de wetenschap, participatie van burgers en patiënten in onderzoek). Door middel van opdrachten raak je bekend met de praktische kant van wetenschapscommunicatie, bijvoorbeeld wetenschapsjournalistiek, voorlichting, dialogen en debatten, etc. De opdrachten worden deels individueel uitgevoerd en deels in een groep.

Onderwijsvorm

Colleges 15 uur

Zelfstudie en tentamen 70 uur

Werkcolleges 15 uur

Opdrachten 60 uur

Toetsvorm

Individuele toetsing bestaat uit:

- Schriftelijk tentamen (50%)
- groepsopdrachten (25%)
- individuele opdrachten (25%)

Literatuur

Literatuur wordt aangeboden via Blackboard en een maand voor de cursus bekendgemaakt.

Doelgroep

Keuzecursus voor tweedejaars en derdejaars BSc Biomedische Wetenschappen en Biologie en BSc. Gezondheid en Leven. Ook te volgen voor de Bsc binnen Aardwetenschappen en Exacte Wetenschappen. Speciaal aanbevolen voor studenten die overwegen de C-variant (wetenschapscommunicatie) of M-variant (beleid en management) in hun masterprogramma op te nemen.

Overige informatie

We werken met enkele gastsprekers die een maand voor de cursus bekend zullen zijn.