



Physics MSc

Vrije Universiteit Amsterdam - Faculteit der Exacte Wetenschappen - M Physics - 2014-2015

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 1 out of 2](#)
- [Compulsory Choice of 12 ec](#)
- [Recommended optional Courses](#)
- [Compulsory Courses](#)

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
Principles of Pharmaceutical Sciences / Pharmacochimistry	Periode 1	6.0	X_435675
Project Sustainable Future	Periode 6	6.0	X_432784
Protein Science	Periode 1	6.0	AM_470145

Recommended optional Courses

The choice of 18 ec should be filled with courses at masters level and has to be approved by the Examination Board

Vakken:

Naam	Periode	Credits	Code
Science and Society in a Hist. Persp.	Periode 5	6.0	X_400424
Technology and Innovation Processes	Periode 2	6.0	E_BA_TIP

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
Science project	Ac. Jaar (september)	24.0	X_422591
Transdisciplinarity and Transition	Periode 2	6.0	X_430604

Specialization Science for Energy and Sustainability

Opleidingsdelen:

- [Compulsory Choice of at least 24 ec.](#)
- [Compulsory Choice Ethics and Portfolio Academic skills](#)
- [Compulsory Choice Master Project](#)
- [Compulsory Courses](#)

Compulsory Choice of at least 24 ec.

Vakken:

Naam	Periode	Credits	Code
Big Issues in Emergent Energy Materials	Periode 1	6.0	X_422587
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
Open Innovation in Science	Periode 2	6.0	X_430583
Organic Photovoltaics	Periode 2	6.0	X_422590
Photosynthesis and Energy	Periode 5	6.0	X_422553

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 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.

Vakken:

Naam	Periode	Credits	Code
Master Project SfES	Ac. Jaar (september)	30.0	X_422593
Master Project SfES	Ac. Jaar (september)	36.0	X_422594
Master Project SfES	Ac. Jaar (september)	42.0	X_422595
Master Project SfES	Ac. Jaar (september)	48.0	X_422596
Master Project SfES	Ac. Jaar (september)	54.0	X_422597

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Current Sustainable Energy Technologies	Periode 3	6.0	X_422582
Literature Thesis SES	Ac. Jaar (september)	6.0	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:

- [Optional courses: select at least 12EC](#)
- [Compulsory Courses](#)

Optional courses: select at least 12EC

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
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

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Internship Communication Specialisation	Ac. Jaar (september)	30.0	AM_471148
Qualitative and Quantitative Research Methods	Periode 1	6.0	AM_470582
Science and Communication	Periode 1	6.0	AM_470587

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:

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

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	Periode 1+2, Periode 4+5	6.0	O_MLADEPI
Algemene Didactiek en Pedagogiek II	Periode 1+2, Periode 4+5	3.0	O_MLADEPII
Praktijk I	Periode 1+2+3, Periode 4+5+6	15.0	O_MLPRAKI
Praktijk II	Periode 1+2+3, Periode 4+5+6	15.0	O_MLPRAKII
Professionele ontwikkeling en onderzoek I	Periode 1+2+3, Periode 4+5+6	3.0	O_MLVPOOI
Professionele ontwikkeling en onderzoek II	Periode 1+2+3, Periode 4+5+6	6.0	O_MLVPOOII
Vakdidactiek Natuurkunde I	Periode 1+2, Periode 4+5	3.0	O_MLVDNAI
Vakdidactiek Natuurkunde II	Periode 1+2, Periode 4+5	6.0	O_MLVDNAII
Verdieping	Periode 2+3, Periode 5+6	3.0	O_MLVERD

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

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

Master coordinators

Dr. H.J. Bulten (VU)
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E hj.bulten@vu.nl

Dr. E. de Wolf (UvA)
T +31 (0) 20 592 5123
E e.dewolf@uva.nl

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	Periode 1+2+3	6.0	X_420128
Gravitational Waves (Selected Topics in Gravitation and Cosmology)	Periode 4+5+6	3.0	X_428506
Group Theory	Periode 1	6.0	X_420025
Particle Cosmology	Periode 4+5+6	6.0	X_420560
Particle Detection	Periode 4+5+6	6.0	X_420051
Particles and Fields	Periode 4+5	6.0	X_420112
Physics of Anti-matter	Periode 4+5+6	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

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

Prof.dr. P.J.G. Mulders (VU)
 K room T-222
 T +31 (0) 20 598 7863
 E pjg.mulders@few.vu.nl

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	Periode 1+2+3	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	Periode 4+5+6	6.0	X_420100
Statistical Physics and Condensed Matter Theory II - Extension	Periode 3	3.0	X_428519
String Theory	Periode 4+5+6	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	Periode 4+5+6	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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K room T-264
T +31 (0) 20 598 7951
E h.l.bethlem@vu.nl

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)	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)	48.0	X_422563
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	Periode 4	6.0	X_428534
Fermi Quantum Gases	Periode 4+5+6	6.0	X_428514
Forensics with complex liquids	Periode 4+5+6	3.0	X_428538
Hydrodynamics	Periode 4+5+6	6.0	X_428536
Mathematica for physicists	Periode 3	3.0	X_428533
Nanophotonics	Periode 4+5+6	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	Periode 4+5+6	3.0	X_428521
Superconductivity	Periode 4	6.0	X_428522
Ultrafast Laser Physics	Periode 5	6.0	X_422556
Ultrafast X-ray Physics	Periode 4+5+6	3.0	X_428524

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Big Issues in Atomic Quantum Physics	Periode 4	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)	30.0	X_422540
Master Project Physics: PLH	Ac. Jaar (september)	36.0	X_422541
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 5	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	Periode 4+5+6	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 4	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	Periode 2	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
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 Science in Society specialisation](#)

MSc Biology Science in Society specialisation

The Master's graduate with a Science in society specialization combines an academic approach with the skills and competences that will allow him or her to perform scientific research at the interface of the biomedical sciences and society. The specialization aims to develop strategies that contribute to an understanding of complex societal problems and strategies to solve complex societal problems through interdisciplinary

research. In addition, the programme analyses the social, economic and ethical aspects of new developments in the biological sciences, so as to assess their implications for society. Master's graduates have the necessary skills to collaborate and communicate with researchers from various scientific disciplines (including but not limited to those in the biological sciences) and societal actors, and the ability to use these academic insights.

The Science in Society specialization has a study load of 54 EC.

Opleidingsdelen:

- [Compulsory courses](#)
- [Compulsory choice of at least 6 EC](#)

Compulsory courses

Vakken:

Naam	Periode	Credits	Code
Analysis of Governmental Policy	Periode 1	6.0	AM_470571
Communication, Organization and Management	Periode 2	6.0	AM_470572
Internship Science in Society (BIO)	Ac. Jaar (september)	30.0	AM_1134
Qualitative and Quantitative Research Methods	Periode 1	6.0	AM_470582

Compulsory choice of at least 6 EC

Vakken:

Naam	Periode	Credits	Code
Business Management in Health and Life Sciences	Periode 2	6.0	AM_470584
Clinical development and clinical trials	Periode 3	6.0	AM_470585
Disability and Development	Periode 2	6.0	AM_470588
Entrepreneurship in Health and Life Sciences	Periode 2	6.0	AM_470575
Health, Globalisation and Human Rights	Periode 2	6.0	AM_470818
Policy, Politics and Participation	Periode 2	6.0	AM_470589
Science in Dialogue	Periode 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
Examinator	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)
Periode	Periode 1
Credits	6.0
Voertaal	Nederlands
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. P.J.G. Mulders
Examinator	prof. dr. P.J.G. Mulders
Docent(en)	prof. dr. P.J.G. Mulders
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	300

Doel vak

To develop skills in performing quantum mechanical calculations at an advanced level and study applications in various research fields.

Inhoud vak

- Symmetries in quantum mechanics: time and space translations, rotations, boosts (nonrelativistic) and applications (Bloch theorem,...)
- Repetition of angular momentum: orbital angular momentum and spin; addition of angular momenta, Clebsch-Gordan coefficients. Advanced topics such as 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
- Scattering theory comparing using Fermi's golden rule and using Greens functions (phase shifts, cross sections, ...)
- 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	Periode 1+2, Periode 4+5
Credits	6.0
Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek
Docent(en)	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, drs. W.S. Hoekstra, drs. C.D.P. van Oeveren, drs. S. Donszelmann, drs. B. Klein, drs. W. Jongejan, dr. H.B. Westbroek, dr. E. van den Berg, C.L. Geraedts, drs. A. Krijgsman, dr. A.A. Kaal, dr. J.J.M. van Eersel, drs. K.L. Schaap, W. Maas, drs. G.D. van Hummel, F.L. de Vries MSc, drs. H. Stouthart, drs. I. Pauw
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	Periode 1+2, Periode 4+5
Credits	3.0
Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek
Docent(en)	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, drs. W.S. Hoekstra, drs. C.D.P. van Oeveren, drs. S. Donszelmann, drs. B. Klein, dr. T. Bosma, dr. H.B. Westbroek, dr. E. van den Berg, C.L. Geraedts, drs. A. Krijgsman, dr. A.A. Kaal, dr. J.J.M. van Eersel, drs. K.L. Schaap, W. Maas, drs. G.D. van Hummel, F.L. de Vries MSc, drs. H. Stouthart, drs. I. Pauw
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	drs. R.M. Edelenbosch MA
Examinator	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
Examinator	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	Periode 4
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

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>

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
Examinator	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 viscoelastic models, spectral analysis, compartment models, geometric modelling used in image

analysis and models to describe molecular structures and their dynamic behaviour.

Examples will concentrate on cardiovascular function: linear and nonlinear

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 (20%), report and presentation on modelling problem (40%) and written exam (40%).

Literatuur

Syllabus.

Book (recommended): Gilat, A., MatLab: An Introduction with Applications 5th ed, Wiley.

Doelgroep

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

Biomedical Optics

Vakcode	X_428529 (428529)
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/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
Examinator	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
Examinator	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 or other products 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 physical and chemical 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, mPhys-SBI, mCh-SBI

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
Examinator	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
Examinator	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:

- 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.
- 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 (50% of final grade)
- the assignment must be completed with a written document and short presentation before the group (50% 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

Doelgroep

M Chem -SBI or M Physics - SBI

Overige informatie

In case you have any questions about this course, please contact the coordinator at <p.van.hoorn@vu.nl>;

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
Examinator	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
Examinator	dr. H.J. Bulten
Niveau	500

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
Examinator	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 study proteins and the modulation of their function, with a specific emphasis on drug discovery

Inhoud vak

In this course emphasis will be given on the interface between Chemistry and Biology. How can one understand biological processes 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/or modulate DNA, RNA and protein expression and/or function with chemical probes? These are the questions that are central to this course.

Onderwijsvorm

lectures, tutorial, consultancy sessions and case study/presentation

Toetsvorm

Students will work in small groups on an integrated case study. Based on primary literature, background information from Comprehensive Medicinal Chemistry, interaction with "Protein Champions", students will work on a "Chemical Biology Protein Report" and oral presentation. Finally, there will be a written examination at the end of the course on the various topics presented in the course.

Final grades will be based on results of the case study (35%), case presentation and discussion (15%) and final exam (50%). Each part must at least be satisfactory (mark "6 out of 10" or higher).

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

Intekenprocedure

Please register as soon as possible online.

Overige informatie

Presence is obliged at predefined moments of the course (e.g. kick-off meeting, presentation session, examination).

Classical and quantum Chaos

Vakcode	X_428534 ()
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/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	prof. dr. H.J.H.M. Claassen
Examinator	prof. dr. H.J.H.M. Claassen
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)
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. M.H.M. Janssen
Examinator	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
Examinator	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
Examinator	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. T.P. Groen
Examinator	dr. T.P. Groen
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
Examinator	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
Examinator	dr. J.P. Dekker
Docent(en)	dr. J.P. Dekker, dr. R.N. Frese
Lesmethode(n)	Hoorcollege, Werkcollege

Niveau	500
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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, five discussion meetings in weeks 1, 2 and 3 in groups of about 10 students, final meeting with all participants in week 4 in which students present their most important worked-out question.

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	H.B. Miranda Galarza MSc
Examinator	H.B. Miranda Galarza MSc
Lesmethode(n)	Hoorcollege, Werkgroep

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,
- Disability-relevant research methods, including examples of disability research
- An introduction to community-based rehabilitation and disability inclusive development.

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

For more information contact dr. Christine Dedding (c.dedding@vu.nl) or dr. Beatriz Miranda Galarza (b.mirandagalarza@vu.nl)

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

Lectures, guest lectures, literature essay, oral literature presentation

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
Examinator	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
Examinator	prof. dr. J.T. de Cock Buning
Docent(en)	prof. dr. J.T. de Cock Buning, dr. J.F.H. Kupper
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Doel vak

To provide a toolbox of ethical instruments to analyze properly moral problems related (to one's own) research in the life sciences

- To acquire conceptual knowledge of the central concepts in applied philosophy and professional ethics
- To challenge an ethical reflection on one's own life science specialization and to open it for an impartial and constructive discussion
- To exercise a team based project to enter prepare and execute a moral dialogue
- To acquire the necessary skills to handle ethical issues in an accountable manner, as a professional academic beyond one's own inclinations and prejudgments

Inhoud vak

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

Onderwijsvorm

Ethics in the Life Sciences is a fulltime course of four weeks (3 ECTS).

The total study time is 80 hours.

The different elements have the following study time:

- Lectures: 13 hours
- Work groups: 17 hours
- Group assignment: 24 hours
- Exam: 2 hour
- Presentation : 4 hours
- Self working (reading in the first week): 20 hours

Please note that attendance to the work group meetings is compulsory. Attendance to the lectures is highly recommended. In our experience, relying on self-study alone is insufficient to apply the theory of the lectures in the assignments of the workgroups, and to pass the exam.

Toetsvorm

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

Literatuur

Available on Blackboard

Vereiste voorkennis

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

Doelgroep

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

Overige informatie

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

In order to maximize the experience of differences in values and preferences, and this increase meaningful ethical inquiry we will place you randomly in the workgroups. Placement will be communicated after the introduction lecture.

Expertise and coördination in Knowledge Intensive Firms

Vakcode	X_432738 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
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 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	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/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
Examinator	prof. dr. R. Fleischer
Docent(en)	prof. dr. R. Fleischer
Lesmethode(n)	Hoorcollege, Werkcollege

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

Location 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.

Forensics with complex liquids

Vakcode	X_428538 ()
Periode	Periode 4+5+6
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	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/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	Periode 1+2+3
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege

Niveau	400
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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	Periode 4+5+6
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H.J. Bulten
Examinator	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
Examinator	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

The student;

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

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):

Cees Hamelink

Christine Dedding (Children and rights)

Fiona Budge (Culture and Health)

Bert Keizer (Elderly Rights)

Els Mons (Rights and disabled persons)

Women on Waves

Doctors without Borders

And more to be announced.

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

Luijn (a.van.luijn@vu.nl)

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	Periode 4+5+6
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
Examinator	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.

Literatuur

Reader

Internship Communication Specialisation

Vakcode	AM_471148 ()
Periode	Ac. Jaar (september)

Credits	30.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. J.F.H. Kupper
Examinator	dr. J.F.H. Kupper
Niveau	600

Doel vak

The internship is a compulsory part of the Master's programme. The aims of the internship are:

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

Inhoud vak

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

Onderwijsvorm

Work placement, under supervision of VU-staff.

Toetsvorm

Within six weeks after the start of the internship a Go/No Go evaluation is made by the VU supervisor. The aim of this interim evaluation is to decide whether the project and the student both have enough potential to continue (Go) or not (No Go). This evaluation is based on:

- Written material by the student, including a final research proposal and either the Introduction or Methods section of the article or both.
- Attitude of the student and execution of the project during the initial stage.

The final assessment of the internship is undertaken by the VU-supervisor and the second assessor.

In the final assessment, the VU supervisor assesses four different aspects of the internship:

- the attitude of the student
- the execution of the reflective practice placement
- the final report/article
- the oral presentation

The second assessor provides an assessment of the final report only.

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

Vereiste voorkennis

The student is enrolled in the Master's programme Biology of which the internship is part.

The student has passed the following courses:

AM_470582, Qualitative and Quantitative Research Methods

AM_470587, Science and Communication

And the student has acquired 6EC of the following courses:

AM_470572, 6EC, Communication, Organization and Management

AM_1002, 6EC, Science in Dialogue

AM_471014, 6EC, Science Journalism

AM_470590, 6EC, Science Museology

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

Doelgroep

Students from the MSc Biology to specialize in Communication

Intekenprocedure

The research proposal is approved by the placement coordinator and the VU-supervisor, after which the application has to be approved by the masters' coordinator in advance (on behalf of the examination board).

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

Overige informatie

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

Internship Science in Society (BIO)

Vakcode	AM_1134 ()
Periode	Ac. Jaar (september)
Credits	30.0
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. T.J. Schuitmaker-Warnaar

Doel vak

The aim of the internship as part of the Major Science in Society (societal specialisation) is to apply the competences acquired during the previous courses in a research project in order to ground the knowledge, attitudes and skills of interdisciplinary research. More specifically, the aims of the internships are:

- The student learns to independently conduct scientific research.
- The student is able to independently find scientific information and to evaluate this for the benefit of his or her own research question.
- The student is able to apply scientific methods and knowledge, to answer research questions and to generate evidencebased knowledge.
- The student is able to formulate a research question, to choose, to implement and to evaluate the (appropriate) research method, and to phrase the obtained results in report.
- The student is able to cooperate with researchers of various disciplines.
- The student is able to orally present the research results and to discuss the findings.
- The student obtains a good impression of a potential future field of career.

Inhoud vak

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

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

An internship typically has three phases

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

Onderwijsvorm

Research internship

Toetsvorm

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

Within six weeks after the start of the master internship, an interim

evaluation will take place to assess whether there is a reasonable chance of the placement being brought to a successful completion.

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

Vereiste voorkennis

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

Doelgroep

Students Major Science in Society (societal specialisation)

Intekenprocedure

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

Overige informatie

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

Information on internships is made available on Blackboard.

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
Examinator	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
Examinator	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
Examinator	dr. S.M. Witte
Niveau	500

Literature Thesis SES

Vakcode	X_432785 ()
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.C. Slootweg
Examinator	dr. J.C. Slootweg
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

Examinator	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. Increase awareness of the importance sustainability for future business professionals
2. Increase understanding of how companies, public and government are interrelated in addressing and solving sustainability issues
3. Explore how sustainable innovation can be managed

This last learning goal has to be made explicit in the assignment.

Inhoud vak

This course provides a management concept for sustainable innovation management in commercial and governmental organizations. It provides answers to the question how people, teams, projects, companies and governments can create value and competitive advantage by adopting sustainability as a key driver for their innovation processes.

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 centered 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 in 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. Sustainability is not a fashion or an attempt of firms to 'look good', empirical evidence suggest that proper sustainability management improves firm performance and creates new entrepreneurial opportunities in rapidly growing markets. One only has to think of the successes of the Body Shop, Ben and Jerry's and Fair Trade coffee and chocolate.

Onderwijsvorm

Two days a week. One for the tutorial and one to discuss theory and the assignments in small groups.

Assignment:

Students write a strategic business plan for an existing sustainable

innovation with an existing firm, e.g. solar panels of BP, the e-player of Sony, or the hybrid cars of Toyota.

In the assignment students use the literature offered in the course to assess the 'quality' of the management of sustainable innovation of these firms. What could these firms improve if they would make use of insights from theory? And what would hence be your advice to these companies at the end of the day?

Toetsvorm

The final grade of the course is determined by the research assignment and a written exam. To pass the course, students must at least score 5.0 for both the assignment and the exam, and score an average of at least 5.5. The research assignment (25%) and written exam (75%) determine the end grade

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
Examinator	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 technological development through Responsible Research and Innovation
- 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 2014.

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)

and others

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
Examinator	dr. H.J. Bulten
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
Examinator	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
Examinator	prof. dr. M.H.M. Janssen
Niveau	600

Master Project Physics: AMEP

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

Master Project Physics: PLH

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

Master Project Physics: PLH

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

Master Project SfES

Vakcode	X_422593 ()
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Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	600

Master Project SfES

Vakcode	X_422594 ()
Periode	Ac. Jaar (september)
Credits	36.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.T.M. Kennis
Examinator	dr. J.T.M. Kennis
Niveau	600

Master Project SfES

Vakcode	X_422595 ()
Periode	Ac. Jaar (september)
Credits	42.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.T.M. Kennis
Examinator	dr. J.T.M. Kennis
Niveau	600

Master Project SfES

Vakcode	X_422596 ()
Periode	Ac. Jaar (september)
Credits	48.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.T.M. Kennis
Examinator	dr. J.T.M. Kennis
Niveau	600

Master Project SfES

Vakcode	X_422597 ()
Periode	Ac. Jaar (september)
Credits	54.0

Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.T.M. Kennis
Examinator	dr. J.T.M. Kennis
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
Examinator	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

Introduction to mathematical techniques that are particularly useful in theoretical physics.

Inhoud vak

Calculus of variations; Classical field theories; Greens functions and applications; Linear spaces and orthogonal functions.

Onderwijsvorm

Lectures and working classes.

Toetsvorm

Written exam and homework.

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 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/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
Examinator	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
Examinator	prof. dr. M.H.M. Janssen
Niveau	500

Minor Project Physics: AMEP

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

Niveau	500
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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
Examinator	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
Examinator	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
Examinator	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
Examinator	dr. S.M. Witte

Niveau	500
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Nanophotonics

Vakcode	X_428537 ()
Periode	Periode 4+5+6
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 a software tool ORA/Automap to conduct social and semantic network analysis on text documents.

Inhoud vak

The seminar Networked Organizations and Communication aims at gaining in-depth insight into networks and network analysis. 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.).

A particular focus will thus be on gaining insights into social and semantic networks and on the software program with which one can analyze and visualize social or semantic networks. This course addresses three aspects of organizational networks: structure, content and meaning.

Onderwijsvorm

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

Toetsvorm

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

Literatuur

Series of articles to be announced on Blackboard.

Vereiste 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.

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
Examinator	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>

Open Innovation in Science

Vakcode	X_430583 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	drs. P. van Hoorn
Examinator	drs. P. van Hoorn
Docent(en)	prof. dr. ir. B.A.G. Bossink, drs. P. van Hoorn
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak

In this final course in the Business and Innovation course series across the Bachelor SBI program, the challenges involved in 'Open Innovation' (OI) are the central theme. Classes cover the dominant OI theoretical insights and crucial aspects of OI based on various pieces of literature, a book and casework on the subject.

Students will gain insight in the emergence, distribution, application and marketing of scientific knowledge in a complex network of stakeholders. Through the case work assignments, teams will learn to apply OI principles and aim to take on inherent OI challenges in transitions that are taking place in both the Energy and Life sciences sectors.

Inhoud vak

1. Theories, trends and practice of OI through literature study which also will be presented and discussed in class. These materials are the subject of a final written exam.

2. Assignments based on actual cases, including Harvard Cases.

In this course two cases will be presented with the purpose of demonstrating the dilemma's that open innovation practices inevitably lead to. And to subsequently apply the theoretical OI principles to both cases through executing a team assignment.

Case A: Vertex and the CF Foundation have developed a novel drug. The R&D trajectory breaks the mold of the fully-integrated pharma approach to development through aspects like: advocacy group financing of research, end-user driven innovation, ownership position of developers, R&D within a heterogeneous network and last but not least, patient benefit as the primary driver. (two Harvard cases: a: Vertex and b: Bob Beale and the CFF)

Case B: Alliander, an energy supply and network company drives an international network of innovator start-ups collectively playing in the smart grid space. Also here, the setting provides many challenges that test the OI framework.

Onderwijsvorm

Lectures, guest lectures, casework en reports

Toetsvorm

The final course grade is composed of a grade on casework per team (50%) and individual written exam (50%).

The assignment outputs include a final report and a presentation.

Literatuur

Open Innovation, Researching a New Paradigm. Edited by Henry Chesbrough et al. 2008 - Oxford University Press, first published in 2006. NOTE: a book by Tidd (Sussex) that was issued in 2014 is considered for this course to replace Chesbrough.

Higgins et al (2007) - Vertex Pharmaceuticals and the CF Foundation: Venture Philanthropy Funding for Biotech, 2007 by Harvard Business School
Kaplan et al – Bob Beall at the CF Foundation (2009) by Harvard Business School.

Vereiste voorkennis

Natural sciences courses, including Physics and (Bio)Chemistry (level 100) as well as basics in Innovation sciences

Aanbevolen voorkennis

SBI Students taking OlinS, are expected to have completed: IW for SBI1, O&I for SBI2 or similar as well as the 4 preceding Innovation Projects. Having attended Technology & Innovation will be a great benefit to students taking OI in S.

Doelgroep

3 B SBI. OI in S is part of the broad SBI Minor for Science students. Non SBI Bachelor students enrolled may be requested to study additional preparatory literature, preceding execution of the group assignment.

Overige informatie

Should you have any questions about this course, please send an Email to <p.van.hoorn@vu.nl>;

Organic Photovoltaics

Vakcode	X_422590 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. E.L. von Hauff
Examinator	dr. E.L. von Hauff
Docent(en)	dr. E.L. von Hauff
Lesmethode(n)	Hoorcollege
Niveau	400

Inhoud vak

The course is comprised of three main topics:

- Properties of organic semiconductors – organic semiconductors possess semiconducting attributes due to their unique electronic structure. The optical, electrical and structural properties, as well as fabrication and characterisation techniques will be introduced.
- Photovoltaic energy conversion – photovoltaic energy conversion is based on the absorption of light, the separation and transport of charge carriers, the collection of photocurrent. These processes will be discussed in terms of the material properties of organic semiconductors.
- Current research questions in organic photovoltaics – charge carrier separation and transport is a unique problem in organic semiconductors. Correlations between material properties and solar cell efficiency will be established.

Onderwijsvorm

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

Toetsvorm

Student-presentations during the lectures

Doelgroep

mPhy

mCh

Part of track Science for Energy and Sustainability

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
Examinator	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
Coördinator	dr. J.C. de Munck
Examinator	dr. J.C. de Munck
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)
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Periode	Periode 4+5+6
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H.J. Bulten
Examinator	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
Examinator	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
Examinator	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)
Periode	Periode 4+5
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H.J. Bulten
Examinator	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
Examinator	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	Periode 4+5+6
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H.J. Bulten
Examinator	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
Examinator	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	Periode 2

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	C.A.C.M. Pittens MSc
Examinator	C.A.C.M. Pittens MSc
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

Total course 6 EC = 160 hours
lectures 14 hours
training workshops 4 hours,
project assignment 102 hours
focus group execution 3 hours
Self study 33 hours
final presentations project results: 4 hours

Toetsvorm

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

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

Literatuur

To be announced on Blackboard

Vereiste voorkennis

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

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.

Intekenprocedure

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

Overige informatie

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

Praktijk I

Vakcode	O_MLPRAKI ()
Periode	Periode 1+2+3, Periode 4+5+6
Credits	15.0
Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek
Coördinator	ir. E.J.F. Scheringa
Examinator	ir. E.J.F. Scheringa
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 uren 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 instituutbegeleider moet worden onderschreven.

Vereiste voorkennis

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

Praktijk II

Vakcode	O_MLPRAKII ()
Periode	Periode 1+2+3, Periode 4+5+6
Credits	15.0
Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek
Coördinator	ir. E.J.F. Scheringa
Examinator	ir. E.J.F. Scheringa
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 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. 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 / Pharmacochimistry

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
Examinator	prof. dr. I.J.P. de Esch
Docent(en)	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

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 farmaceutische wetenschappen and these mDDS students should contact the mDDS coordinator before enrolling.

The course is recommended for SBI (life) mastertrack students, except for students with an bachelor in SBI or pharmaceutical sciences.

Professionele ontwikkeling en onderzoek I

Vakcode	O_MLVPOOI ()
Periode	Periode 1+2+3, Periode 4+5+6
Credits	3.0
Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek
Docent(en)	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, drs. I. Pauw, drs. W.S. Hoekstra, drs. C.D.P. van Oeveren, drs. S. Donszelmann, drs. S. Attema-Noordewier, drs. W. Jongejan, dr. H.B. Westbroek, dr. E. van den Berg, C.L. Geraedts, drs. A. Krijgsman, prof. dr. J.J. Beishuizen, dr. A.A. Kaal, dr. J.J.M. van Eersel, drs. K.L. Schaap, W. Maas, drs. G.D. van Hummel, F.L. de Vries MSc, drs. H. Stouthart
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. Daarnaast wordt een start gemaakt met het formuleren van de eigen visie op onderwijs en 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	Periode 1+2+3, Periode 4+5+6
Credits	6.0
Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek

Coördinator	dr. H.B. Westbroek
Examinator	dr. H.B. Westbroek
Docent(en)	dr. C.P. van Velzen, drs. W. Jongejan, dr. T. Bosma, dr. H.B. Westbroek, dr. E. van den Berg, dr. A.A. Kaal, dr. J.J.M. van Eersel, dr. A. Handelzalts, W. Maas
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	500

Doel vak

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

Inhoud vak

Dit vak bestaat uit twee delen: een reflectiedeel en een onderzoeksdeel. Het reflectiedeel krijgt vorm en inhoud in begeleide en zelfstandige intervisiegroepen waarin studenten reflecteren op hun praktijk aan de hand van cases en eigen videobeelden. Daarnaast formuleren de studenten in dit deel hun visie op onderwijs en leren.

In het praktijkonderzoeksdeel diept de student in samenwerking met een medestudent één of meer vraagstukken uit de (eigen) onderwijspraktijk uit. Hij of zij doet dat door het samen 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 deels gemaakt is tijdens de module Professionele Ontwikkeling en Onderzoek 1 en deels in POO 2 ontwerpen studenten onderzoeksinstrumenten om empirisch gegevens te verzamelen voor het beantwoorden van de onderzoeksvraag en voeren zij het onderzoek uit.

Voordat het onderzoeksplan mag worden uitgevoerd, moet het worden goedgekeurd door de eerste en tweede beoordelaar.

In een artikel voor collega docenten rapporteren studenten over het onderzoek waarin aan de orde komen vraagstelling, relevantie, verankering in bestaande theorie, gebruikte instrumenten, data, conclusie en discussie. De studenten presenteren ook hun onderzoek tijdens de Onderwijsresearchdag.

Onderwijsvorm

Onderzoek, verplichte deelname aan hoorcolleges praktijkonderzoek en werkcollege, intervisiebijeenkomsten, 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

Voordat het onderzoeksplan mag worden uitgevoerd, moet het worden goedgekeurd door de eerste en tweede beoordelaar.

Voor alle onderdelen geldt een aanwezigheidsplicht.

Programming C++

Vakcode	X_420141 (420141)
Periode	Periode 3
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H.J. Bulten
Examinator	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.C. Slootweg
Examinator	dr. J.C. Slootweg
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 become 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 to 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

Doelgroep

mCh-SES, mPhys-SES

Protein Science

Vakcode	AM_470145 ()
Periode	Periode 1
Credits	6.0

Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. D. Bald
Examinator	dr. D. Bald
Docent(en)	dr. M.H. Siderius, prof. dr. ir. E.J.G. Peterman, dr. J.N.M. Commandeur, dr. D. Bald, prof. dr. M.J. Smit
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Doel vak

The student:

1. knows and understands principles of protein structure, dynamics, regulation, inhibition, interaction and engineering
2. can explain protein function based on protein structure and the properties of amino acid residues.
3. can predict the function of (parts of) a protein based on understanding of its molecular properties
4. knows and understands the principle of current methods for protein investigation (e.g. overproduction, purification, interaction, engineering)
5. can analyze the strong and weak points of Protein Science techniques and can correlate an open question with a suitable technique.
6. can analyze experiments in Protein Science and design new experiments.

Inhoud vak

We will start with a repetition of protein structure and function. Subsequently, we will focus on methods in protein science and also on more specialized properties of proteins important in fundamental research, biomedicine or biotechnology. Finally we will deal with case studies on selected proteins.

Lecture topics include:

Protein Structure, Protein Function, Protein Dynamics, Molecular Machines, Control of Protein Function, Protein inhibition, Antibiotic action, Development of antibiotics and antibiotic resistance, Protein over-expression and purification, Protein Interaction, Protein Engineering,

Molecular Modeling and docking

Case studies:

GPCRs as drug target, Cytochrome P450, Chaperones as Protein folding machines,

Molecular Modeling/docking.

Onderwijsvorm

Lectures (30 h) accompanied by work (paper) discussions (6 h) and self study

(individual or in small groups) to prepare for the lectures and to discuss the material presented in lectures/accompanying papers.

Toetsvorm

Written exam

Literatuur

No special book required. Useful may be "Protein Structure and Function" by Petsko/Ringe. You can also use any Biochemistry textbook (e.g. Voet and Voet) for repetition. You will receive material

(reviews and original articles on relevant topics). Examples of scientific literature: Lee et al. Nature 2010, Bax et al. Nature 2010, and Kumar Exp. Opin. Drug Metab 2010.

Doelgroep

Masters students Biomolecular Sciences, Biomedical Sciences, Biology, Pharmaceutical Sciences and Medical Natural Sciences

Overige informatie

Visiting lecturer: Dr. Anil Koul, Tibotec J&J

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
Examinator	dr. J.F.H. Kupper
Docent(en)	dr. H. Wels, dr. B.J. Regeer, dr. J.F.H. Kupper
Lesmethode(n)	Hoorcollege, Werkgroep, Computerpracticum
Niveau	400

Doel vak

- Understanding the differences between beta- and gamma research;
- To acquire insight and understanding of a real world research process. This includes knowledge of the character of complex societal issues and the needs, advantages and disadvantages of real world research;
- To acquire insight into various quantitative and qualitative research methods 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 be able to make an adequate research design for the investigation of a specific complex societal 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 an approach that investigates, analyzes and integrates the positions and knowledge of different actors. This course offers an (advanced) introduction to various research methods used in real world research: questionnaires, systematic observations using all the senses, surveys and statistics, semi-structured in-depth interviews, as well as focus groups. These methods are commonly used in research into complex problem contexts, communication and opportunities for intervention. Strengths and weaknesses of each research method and technique will be discussed, as well as its possibility to be applied in different societal contexts. 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, you 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 research design.

Onderwijsvorm

Lecture (20h), Training workshops (34h), Research project (107h), Examination (3h).

Toetsvorm

Group assignment (50%) and exam (50%). Both parts need to be graded 6 or higher.

Literatuur

Verschuren, D.E. and Doorewaard, H. (2010). Designing a Research Project (2nd edition)Eleven International Publishing, the Hague. ISBN 978-90-5931-572-3.

Gray, D.E. (2014) Doing Research in the Real World (3rd edition)Sage Publications Ltd, Los Angeles. ISBN 978-1-4462-6019-7

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 Marlous Arentshorst: m.e.arentshorst@vu.nl

Quantum Field Theory

Vakcode	X_420081 (420081)
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
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 ()
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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

Doel vak

The aim of the Master project is that the individual student learns to conduct a comprehensive SBI research project.

Inhoud vak

Further deepening and application of knowledge and skills that are obtained during the bachelor and master program. The project starts with developing a project plan. The plan consists of: literature study, research questions, research methods and techniques, time schedule and research goals. The project starts when the plan is approved by the supervisors from VU University and the supervisor from the organization in which the student conducts the research project. The research project lasts for four to five months, and is centered around a SBI-related problem that is acknowledged by the student and the supervisors. The student produces two deliverables:

- a. A thesis, consisting of scientific research design, results, discussion, and conclusions.
- b. A report describing the organization in which the project is conducted.

Onderwijsvorm

Mandatory classes in December/January.

For further information see Manual Master project SBI (Blackboard). Student will spend most of his/her time on conducting the research project and writing the thesis. Additionally, some time will also be

spent on contributing to practical work in the organization that enables the research project.

Toetsvorm

Thesis and oral presentation

Literatuur

Verschuren, P., Doorewaard, H. (most recent edition) Designing a research project. The Hague: Eleven International Publishing.

Vereiste voorkennis

Up-to-date PEP signed by the master coordinator and the examination board. Maximum of 12 EC open, master project excluded, at the start of the internship.

Doelgroep

2 M SBI

Overige informatie

A mandatory part of the Master project is the writing of a reflection report. This reflection consists of two parts: a business analysis and self-reflection. The student has to write the report when the internship is (almost) completed.

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
Examinator	dr. B.J. Regeer
Docent(en)	dr. B.J. Regeer, dr. J.F.H. Kupper, B.M. Tielemans, P. Klaassen MA
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.

Science and Society in a Hist. Persp.

Vakcode	X_400424 (400424)
Periode	Periode 5
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. D.J. Beckers
Examinator	dr. D.J. Beckers
Docent(en)	dr. D.J. Beckers
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	400

Doel vak

To increase understanding of the various interactions between mathematics, chemistry, physics, (medical) biology, computer and earth sciences (in general: science) and society during the last two centuries.

Inhoud vak

In the last two centuries science has become one of the prime agents in the shaping of modern society. In turn social and political concerns have been equally instrumental in the shaping of the modern scientific enterprise. In this course we will study the changing relationship between science and society in this period in various case studies and from several points of view. We will use literature and source material, most notably (journal and film) advertisements, and the cartoon journal Punch to illustrate these cases. The following themes are addressed: professionalization, science and the public (e.g. the public understanding and appreciation of science); Science as product and agent of modernity (e.g. quantification and standardization as applied to nature and society); Science and politics (e.g. science policies, military and commercial interests, science and ideology), science and education.

Onderwijsvorm

seminar.

Toetsvorm

Active participation during the seminar, essay and presentation and a short exam on the topics addressed during the classes.

Literatuur

available via blackboard.

Vereiste voorkennis

introduction history of science

Aanbevolen voorkennis

in possession of a Bachelor degree

Doelgroep

mFEW, mFALW, history

Overige informatie

More information with the course coordinator: Afdeling Algemene Vorming, De Boelelaan 1081, kamer U252, d.j.beckers@vu.nl

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
Examinator	dr. J.F.H. Kupper
Docent(en)	dr. J.F.H. Kupper
Lesmethode(n)	Werkgroep, Hoorcollege
Niveau	500

Doel vak

To gain knowledge of 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 reflective learning and mutual understanding

To acquire or improve:

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

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 self-evaluated by means of a reflection report.

Every course week is completed with a mini-exam.

Onderwijsvorm

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

Toetsvorm

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

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 mandatory.

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
Examinator	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 of and insight into:

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

To acquire skills in:

- writing popular scientific texts for different genres such as news, background and interview
- 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

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

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-specialisation within FALW or FEW will have precedence over other students. Students from other faculties and or universities need to get formal consent from the course coördinator (Frank Kupper) before enrolment.

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
Examinator	dr. B.J. Regeer
Docent(en)	dr. B.J. Regeer, drs. ir. M.G. van der Meij
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Doel vak

- Gain insight in the role of museum exhibits in the field of science communication.
- Gain insight in the role of science communication concepts in the context of science museums.
- Apply qualitative research methods to design, conduct, and report on a user research project in museum settings.
- Apply theoretical notions of science communication and exhibit design to advise on adjustments and/or development of exhibitions.
- Gain experience in working for an external commissioner.

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 in museum settings, and will be introduced to different styles of communication, different approaches to exhibit design & development, and different methods of research and evaluation of exhibitions.

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

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

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 the assignments, 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 lectures from and excursions to for instance Artis, NEMO, Naturalis, NorthernLight, Museon, etc.

Science project

Vakcode	X_422591 ()
Periode	Ac. Jaar (september)
Credits	24.0
Voertaal	Nederlands
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.P. Dekker
Examinator	dr. J.P. Dekker
Niveau	400

Doel vak

The MSc SBI students will follow the Science Project SBI to strengthen their knowledge and experience with 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 and health and/or energy and sustainability. The student will:

- a. actively participate in a research team and is expected to critically follow and discuss research matters that are a subject in meetings as well as present his or her own work to the group on a regular basis. In doing so and through this immersion in faculty research, the student is becoming acquainted with a research process, including its organization, objectives and challenges.
- b. design, execute and deliver his or her own research project and be individually responsible for it, under supervision of a senior scientist. A second and independent reviewer will be assigned to assess the final products.
- c. deliver a final report, present outcomes on a regular basis including a final presentation and make detailed recommendations for further research with respect to his or her research assignment.

Inhoud vak

In this project the student should work closely with laboratory researchers on a project based on modeling and/or experimental lab work. Programs that contain innovation or valorization aspects are ideally suited for participation of SBI students. Once a topic has been agreed upon, the student will agree on a research question. Subsequently the student will draft a research plan in which is addressed: theoretical framework, research methodology and data analysis, experimentation set-up, planning, organization, anticipated outcomes and reporting format. This plan will also include a listing of some relevant literature references pertaining to the particular topic.

The plan may also include a course to provide insight and experience on experimental lab work or modeling. For instance, it is possible to define a drug discovery project that is accompanied by the integrated course Computational Design and Synthesis of Drugs (code 435673). In this course, students will learn step by step about data mining and computer-aided drug design techniques. In other cases it is possible to acquire experimental skills with experiments offered in the courses Natuurkunde Practicum 3 (code 420532) or Practicum Natuurkunde en Informatica (code 420555). In all cases, however, the study load of these courses will be integrated in the Science Project SBI.

Onderwijsvorm

Research project

Toetsvorm

Report and presentation, as explained in the course manual

Literatuur

Depending on the project

Vereiste voorkennis

Requirements to enter the mSBI program

Doelgroep

mSBI

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
Examinator	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
Examinator	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
Examinator	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 natuurkundeleraar 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

- Galileïsche 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
Examinator	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. We also introduce and develop theoretical approaches to understand phase transitions and critical phenomena. These techniques are particularly relevant, but not limited to soft matter systems, which tend to exhibit rich phase behavior, strong thermal fluctuations and high sensitivity/responsiveness to external forces/fields.

Toetsvorm

Written exam

Literatuur

Lecture notes will be provided.

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	Periode 4+5+6
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	Periode 4+5+6
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	Periode 4+5+6
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/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	Periode 4+5+6
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>

Technology and Innovation Processes

Vakcode	E_BA_TIP ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Economische Wet. en Bedrijfsk.
Coördinator	dr. ir. J.J. Berends
Examinator	dr. ir. J.J. Berends
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Doel vak

After finishing this course, students will be able to:

- explain challenges, concepts, and theories with regard to processes of technological innovation
- apply concepts and theories to analyze real life cases and develop solutions to improve innovation processes
- critically reflect upon theoretical assumptions and methodological approaches in research on technology and innovation

Inhoud vak

This course is about processes of technological innovation in and between organizations. In short, this course concerns the creation of innovative ideas and their conversion into products and services that have value for a company and its customers. This course helps students to understand and improve the complex and uncertain process of technological innovation. Topics that will be addressed include the evolution of technology, collaborative innovation, uncertainty and learning, business model innovation, the role of the institutional

context, and timing in innovation processes. The course will focus on specific fields of technology: energy, information technology, life sciences / biotech, and semiconductors.

Onderwijsvorm

The course will consist of a combination of interactive lectures (6), seminars (6), and assignments. The lectures will also include a critical discussion of selected readings, stimulated by obligatory individual reflections on this literature. The seminars will be used to have groups of students present and discuss assignments.

Toetsvorm

Students will be graded based upon three types of assignments:

- Individual reflections on literature
- Group assignments based upon real life cases
- Final group assignment in which theoretical perspectives have to be applied to a specific technological innovation.

Literatuur

A collection of scientific articles, to be announced through Blackboard.

Aanbevolen voorkennis

Basic knowledge of innovation management and organization studies

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 tailor 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 advise 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 multilevel 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. Transdisciplinarity 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, and 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

The total study time is 6 EC(6x28 = 168 hours). Tuition methods include lectures, self-study, response lectures and per team on a different case study as project. In the case study, you'll practice integrating theories and tools, and applying the toolbox.

- lectures 12 hours
- coach meetings 16 hours
- skills training 6 hours
- execution of 2 interviews 2 hours
- execution expert meeting 2 hours
- presentation of project results 4 hours
- self study and project 124 hours
- examination 2 hours (Four mini-exams of 30 minutes)

Please note that attendance to the project meetings is compulsory. For the group project, you will make rules with your group during the first meeting with your coach.

Toetsvorm

The course grade is based on the project (group and individual) and the exam. All aspects have to be concluded with the grade of 5.5 or higher.

Team project report (40%)

Team project presentation (10%)
Attitude and skills assessment (20%)
Exam (30%)

Literatuur

Book: Biotechnology and Food (sold at the start)

Vereiste voorkennis

Proven knowledge of organizations and management and business is required

Doelgroep

master students SBI track (mCh)

Intekenprocedure

As the number of participants will dictate the number of different projects (and the related team coaches), the deadline for VU-net registration will be 4 weeks before the start of the course. Retracting your registration for the course after the deadline will have detrimental effects on the composition of the teams, the network of contacted interviewees and contracted coaches.

Overige informatie

This course mimics the world of a transition task-force. This implies 100% use of the available time (=20 hours a week) to accomplish all the necessary steps in conceptualization of the complexity, data collection, interviews, analysis, validation of pre-liminary result with external experts, and finally presenting your change strategy. You will need to use and integrate all you learned before.

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
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
Examinator	prof. dr. K.S.E. Eikema
Docent(en)	prof. dr. K.S.E. Eikema
Lesmethode(n)	Hoorcollege

Niveau	400
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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 exercises and demonstrations (excursions to the lab).

Toetsvorm

Written exam.

Literatuur

Lecture notes and papers.

Recommended book: "Ultrashort Laser Pulse Phenomena" by J-C Diels and W. Rudolph, 2nd edition (2005), ISBN 978-0-12-215493-5

Aanbevolen voorkennis

Some background in optics and electrodynamics is required.

Doelgroep

Master students physics.

Ultrafast X-ray Physics

Vakcode	X_428524 (428524)
Periode	Periode 4+5+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/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	Periode 1+2, Periode 4+5
Credits	3.0
Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek
Coördinator	dr. E. van den Berg
Examinator	dr. E. van den Berg
Docent(en)	dr. H.B. Westbroek, dr. E. van den Berg, F.L. de Vries MSc
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	Periode 1+2, Periode 4+5

Credits	6.0
Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek
Coördinator	dr. E. van den Berg
Examinator	dr. E. van den Berg
Docent(en)	dr. H.B. Westbroek, dr. E. van den Berg, F.L. de Vries MSc
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	Periode 2+3, Periode 5+6
Credits	3.0
Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek

Docent(en)	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, drs. W.S. Hoekstra, drs. S. Donszelmann, dr. H.B. Westbroek, dr. E. van den Berg, C.L. Geraedts, drs. A. Krijgsman, dr. J.J.M. van Eersel, drs. K.L. Schaap, W. Maas, drs. G.D. van Hummel, F.L. de Vries MSc, drs. H. Stouthart, drs. I. Pauw, drs. C.D.P. van Oeveren
Lesmethode(n)	Werkcollege,
Niveau	500

Doel vak

1. De student verdiept zich in een onderdeel binnen zijn of haar schoolvak of cluster.
2. De student is zich bewust van zijn of haar rol als docent in een pluriforme samenleving.
3. De student kan verschillende aspecten van diversiteit in het onderwijs benoemen en aangeven in hoeverre deze aspecten in zijn of haar eigen schoolvak een rol spelen.

Inhoud vak

Binnen de clusters en vakken worden (verplichte) verdiepingsmodulen aangeboden. Daarnaast volgt elke student het onderdeel diversiteit, waarin een aantal aspecten van onderwijs in een pluriforme samenleving aan bod komen:

1. Wat betekent identiteitsontwikkeling in een door diversiteit gekenmerkte samenleving?
2. Wat is de zin en onzin van diversiteitsgevoelig onderwijs?
3. Wat zijn de verschillende thematieken van diversiteit in de klas?
4. Wat is er bekend uit onderzoek over diversiteit in de onderwijspraktijk?

Onderwijsvorm

Hoorcollege, werkcollege.

Toetsvorm

Analyse van een casus.

Literatuur

Syllabus met artikelen wordt verstrekt.

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
Examinator	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 vertrouwd 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%)

Alle onderdelen moeten met een voldoende worden afgesloten.

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.