Chemistry MSc

Vrije Universiteit Amsterdam - Faculteit der Exacte Wetenschappen - M Chemistry - 2016-2017

This programme is offered jointly with the Universiteit van Amsterdam (UvA).

Specializations
During the Master's in Chemistry, students can specialize themselves by doing a Major in one of the following disciplines:

-Analytical Sciences
-Molecular Sciences
-Science for Energy and Sustainability
-Atomic Scale Modelling of Physical, Chemical and Biomoleculair Systems (AtoSiM)
-Science, Business and Innovation

Variants
The Master's programme of Chemistry offers three different variants for graduation:

-Research variant (O - variant)
-Society-oriented variant (M - variant)
-Communication-education variant (C / E - variant)

The global composition of each variant is indicated below:

Variant	**O**	**M**	**C**	**E**
Compulsory courses (Major)	24-42*	18	18	18
Research project (Major)	42	36	36	36
Literature study and colloquium	12	6	6	6
Ethics and Portfolio academic skills	6	-	-	-
M, C or E programme	-	60	60	60
Optional programme, e.g. - deficiency courses - research project extension - scholarship (company, abroad) - advanced courses	18-36*	-	-	-
Total cp	120	120	120	120

Ad *) Depends on the specialization : Molecular Simulation & Photonics requires 30-42 EC compulsory courses with 18-30 EC optional programme, other specializations require 24 EC compulsory courses with 36 EC optional programme.

Students should arrange the composition of their Master's programme in consult with the Master's coordinator. The exam committee formally has to approve the composition and extent of the Master's programme.

To master guidebook

To master co-ordinators

Inhoudsopgave

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 te 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 Chemistry 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:

- Optional courses for Communication Variant
- Compulsory courses for Communication Variant

Optional courses for Communication Variant

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 for Communication Variant

In addition to the courses below a total of at least 18 EC of track specific courses has to be chosen in consultation with the master coordinator.

Opleidingsdelen:

- Internship communication

Vakken:

Naam	Periode	Credits	Code
Colloquium and Literature Thesis	Ac. Jaar (september)	6.0	XM_432578
Master Research Project Communication Variant	Ac. Jaar (september)	36.0	XM_432586
Research methods for analyzing complex problems	Periode 1	6.0	AM_1182
Science and Communication	Periode 1	6.0	AM_470587

Internship communication

Internship commiunication. Choose one.

Vakken:

Naam	Periode	Credits	Code
Reflective Practice Internship Science Communication	Ac. Jaar (september)	30.0	AM_1163
Research Internship Science Communication	Ac. Jaar (september)	30.0	AM_1162

Education 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 Chemistry vakken, in overleg met de mastercoördinator van de gekozen specialisatie. Hierbij zijn de twee vakken Literature thesis and Colloquium Chemistry Education Variant en Master Research Project Chemistry-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:

- Master Leraar VHO Scheikunde vanaf 2015
- LVHO Scheikunde, overgangsregeling
- Chemistry courses for Education Variant

Master Leraar VHO Scheikunde vanaf 2015

Vakken:

Naam	Periode	Credits	Code
Didactiek 1	Periode 1	6.0	O_MLDIDAC_1
Didactiek 2	Periode 2+3	6.0	O_MLDIDAC_2
Didactiek 3	Periode 1+2+3, Periode 4+5+6	9.0	O_MLDIDAC_3
Peergroup fase 1	Periode 1+2+3	0.0	O_MLPEERGR_1
Peergroup Fase 2	Periode 3+4+5	0.0	O_MLPEERGR_2
Praktijk 1	Periode 1	6.0	O_MLPRAK_1
Praktijk 2	Periode 2+3	9.0	O_MLPRAK_2
Praktijk 3	Periode 1+2+3, Periode 4+5+6	15.0	O_MLPRAK_3
Praktijkonderzoek 1	Periode 3	3.0	O_MLPROZ_1
Praktijkonderzoek 2	Periode 1+2+3, Periode 4+5+6	6.0	O_MLPROZ_2

LVHO Scheikunde, overgangsregeling

Vakken:

Naam	Periode	Credits	Code
Praktijk I	Ac. Jaar (september)	15.0	O_MLPRAKI
Praktijk II	Ac. Jaar (september)	15.0	O_MLPRAKII
Professionele ontwikkeling en onderzoek I	Ac. Jaar (september)	3.0	O_MLVPOOI

Chemistry courses for Education Variant

In addition to the courses below a total of at least 18 EC of track specific courses has to be chosen in consultation with the master coordinator.

Vakken:

Naam	Periode	Credits	Code
Colloquium and Literature Thesis	Ac. Jaar (september)	6.0	XM_432579
Master Research Project Education Variant	Ac. Jaar (september)	36.0	XM_432587

Research Variant Analytical Sciences

The programme constists of 120 credits.

The research training takes place in one of the 4 research groups. Students must contact the Master coordinator at least two months before they would like to start their research training. The research training (Major) starts with a literature study and ends with a Master thesis, an oral presentation and a poster presentation. The research training (Minor) also starts with a literature study and ends with a written report and an oral presentation.

The program starts with an introductory course in which the basic concepts of analytical chemistry and the different areas where it is used, with their own specific problems, are discussed. Then separation techniques, spectroscopy and statistics will be taught at the master level. After these compulsory topics the program leaves a lot of freedom to go in detail into some of the advanced topics.

Research groups

The Master program Analytical Sciences is a unique combination of five strong analytical groups from the VU University Amsterdam (VU) and the University of Amsterdam (UvA). As these groups are complementary, a broad range of analytical topics is covered.

- Applied spectroscopy
- Bio-molecular Analysis
- Polymer analysis
- Biosystems Data Analysis
- Environmental analysis

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.

Master Coordinator:

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Opleidingsdelen:

- Compulsory Choice Ethics and Portfolio academic Skills
- Research Project
- Optional Courses
- Compulsory Courses

Compulsory Choice Ethics and Portfolio academic Skills

Students need to select a total of 6 credits 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
English Academic Course	Periode 2+3, Periode 5+6	3.0	XMU_437028
Science in Perspective	Periode 4+5	6.0	XMU_437030
Teaching Assistant	Ac. Jaar (september)	3.0	XM_432741
Teaching Assistant	Ac. Jaar (september)	6.0	XM_432742
Tutoring Students	Periode 2	3.0	X_432625

Research Project

Compulsory choice of at least 42 credits. Optional extension of 6, 12 or 18 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 Research Project Biomol. Analysis and Spectr.	Ac. Jaar (september)	42.0	XM_432594
Master Research Project Biomol. Analysis and Spectr. ext	Ac. Jaar (september)	18.0	XM_432595
Master Research Project Biomol. Analysis and Spectr. ext	Ac. Jaar (september)	12.0	XM_432637
Master Research Project Biomol. Analysis and Spectr. ext	Ac. Jaar (september)	6.0	XM_432680

Optional Courses

The subject options of 36, 30, 24 or 18 credits can be completed with the possibilities below.

Vakken:

Naam	Periode	Credits	Code

Advanced Separation Sciences	Periode 3	6.0	XMU_432844
Advanced Spectroscopy	Periode 6	6.0	X_432767
Advanced Statistics for Analytical Chemistry	Periode 5	6.0	XMU_437589
Bio-analysis & Clinical Diagnostics	Periode 1	6.0	X_432765
Biosystems Data Analysis	Periode 3	6.0	XMU_437001
Chemical Analysis for Forensic Evidence	Periode 2	6.0	XMU_437003
Environmental Chemistry	Periode 1	6.0	XMU_437004
Environmental Measuring Techniques	Periode 4	6.0	AMU_0005
High-Throughput Screening	Periode 2	6.0	X_435047
Internship Biomolecular Analysis and Spectroscopy	Ac. Jaar (september)	18.0	XM_432523
Internship Biomolecular Analysis and Spectroscopy	Ac. Jaar (september)	24.0	XM_432524
Internship Biomolecular Analysis and Spectroscopy	Ac. Jaar (september)	30.0	XM_432525
Internship Organic Chemistry	Ac. Jaar (september)	18.0	XM_432529
Internship Organic Chemistry	Ac. Jaar (september)	24.0	XM_432530
Internship Organic Chemistry	Ac. Jaar (september)	30.0	XM_432531
Internship Theoretical Chemistry	Ac. Jaar (september)	18.0	XM_432532
Internship Theoretical Chemistry	Ac. Jaar (september)	24.0	XM_432533
Internship Theoretical Chemistry	Ac. Jaar (september)	30.0	XM_432534
Minor Research Project Biomol. Analysis and Spectr.	Ac. Jaar (september)	18.0	XM_432649
Minor Research Project Biomol. Analysis and Spectr.	Ac. Jaar (september)	24.0	XM_432650
Minor Research Project Biomol. Analysis and Spectr.	Ac. Jaar (september)	30.0	XM_432651
Minor Research Project Organic Chemistry	Ac. Jaar (september)	18.0	XM_432640
Minor Research Project Organic Chemistry	Ac. Jaar (september)	24.0	XM_432641
Minor Research Project Organic Chemistry	Ac. Jaar (september)	30.0	XM_432642
Minor Research Project Theoretical Chemistry	Ac. Jaar (september)	18.0	XM_432646
Minor Research Project Theoretical Chemistry	Ac. Jaar (september)	24.0	XM_432647

Minor Research Project Theoretical Chemistry	Ac. Jaar (september)	30.0	XM_432648
Nuclear Magnetic Resonance	Periode 4	6.0	XMU_435667
Protein Analysis	Periode 5	6.0	X_435045
The analytical Chemist in Industry	Periode 4	6.0	XMU_437005

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
(Bio)Molecular Spectroscopy	Periode 5	6.0	X_435062
Colloquium and Literature Thesis	Ac. Jaar (september)	12.0	XM_432581
Fundamentals of Analytical Sciences	Periode 4	6.0	XMU_435059
Mass Spectrometry	Periode 2	6.0	X_435604
Separation Sciences	Periode 1	6.0	X_435609

Research Variant Molecular Design, Synthesis and Catalysis

The progamme consists of 120 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.

Master Coordinator:

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Opleidingsdelen:

- Compulsory Choice Ethics and Portfolio academic Skills
- Research Project
- Recommended optional Courses
- Optional Courses
- Compulsory Courses

Compulsory Choice Ethics and Portfolio academic Skills

Students need to select a total of 6 credits 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
English Academic Course	Periode 2+3, Periode 5+6	3.0	XMU_437028
Science in Perspective	Periode 4+5	6.0	XMU_437030
Teaching Assistant	Ac. Jaar (september)	3.0	XM_432741
Teaching Assistant	Ac. Jaar (september)	6.0	XM_432742
Tutoring Students	Periode 2	3.0	X_432625

Research Project

Compulsory choice of at least 42 credits. Optional extension of 6, 12 or 18 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 Research Project Chemistry - Organic Chemistry	Ac. Jaar (september)	42.0	XM_432598
Master Research Project Chemistry - Organic Chemistry - Extension	Ac. Jaar (september)	6.0	XM_432618
Master Research Project Chemistry - Organic Chemistry - Extension	Ac. Jaar (september)	18.0	XM_432599
Master Research Project Chemistry - Organic Chemistry - Extension	Ac. Jaar (september)	12.0	XM_432685

Recommended optional Courses

The subject options of 36, 30, 24 or 18 credits can be completed with the possibilities below.

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 Spectroscopy	Periode 6	6.0	X_432767

Bio-analysis & Clinical Diagnostics	Periode 1	6.0	X_432765
Biosystems Data Analysis	Periode 3	6.0	XMU_437001
Chemical Analysis for Forensic Evidence	Periode 2	6.0	XMU_437003
Environmental Chemistry	Periode 1	6.0	XMU_437004
High-Throughput Screening	Periode 2	6.0	X_435047
Internship Biomolecular Analysis and Spectroscopy	Ac. Jaar (september)	18.0	XM_432523
Internship Biomolecular Analysis and Spectroscopy	Ac. Jaar (september)	24.0	XM_432524
Internship Biomolecular Analysis and Spectroscopy	Ac. Jaar (september)	30.0	XM_432525
Internship Organic Chemistry	Ac. Jaar (september)	18.0	XM_432529
Internship Organic Chemistry	Ac. Jaar (september)	24.0	XM_432530
Internship Organic Chemistry	Ac. Jaar (september)	30.0	XM_432531
Internship Theoretical Chemistry	Ac. Jaar (september)	18.0	XM_432532
Internship Theoretical Chemistry	Ac. Jaar (september)	24.0	XM_432533
Internship Theoretical Chemistry	Ac. Jaar (september)	30.0	XM_432534
Minor Research Project Biomol. Analysis and Spectr.	Ac. Jaar (september)	18.0	XM_432649
Minor Research Project Biomol. Analysis and Spectr.	Ac. Jaar (september)	24.0	XM_432650
Minor Research Project Biomol. Analysis and Spectr.	Ac. Jaar (september)	30.0	XM_432651
Minor Research Project Organic Chemistry	Ac. Jaar (september)	18.0	XM_432640
Minor Research Project Organic Chemistry	Ac. Jaar (september)	24.0	XM_432641
Minor Research Project Organic Chemistry	Ac. Jaar (september)	30.0	XM_432642
Minor Research Project Theoretical Chemistry	Ac. Jaar (september)	18.0	XM_432646
Minor Research Project Theoretical Chemistry	Ac. Jaar (september)	24.0	XM_432647
Minor Research Project Theoretical Chemistry	Ac. Jaar (september)	30.0	XM_432648
Organic Photovoltaics	Periode 5	6.0	X_422590
Protein Analysis	Periode 5	6.0	X_435045
The analytical Chemist in Industry	Periode 4	6.0	XMU_437005

Optional Courses

Vakken:

Naam	Periode	Credits	Code
Bio-Organic Chemistry	Periode 2	6.0	X_435669
Coordination and Organometallic Chemistry	Periode 2	6.0	XMU_435664
Heterogeneous Catalysis	Periode 3	6.0	XMU_428013
Homogeneous Catalysis	Periode 5	6.0	XMU_435668
Molecular Computational Chemistry	Periode 5	6.0	X_435666
Nuclear Magnetic Resonance	Periode 4	6.0	XMU_435667
Supramolecular Chemistry and Nanomaterials	Periode 1	6.0	XMU_435653
Synthetic Organic Chemistry	Periode 4	6.0	XMU_435665

Compulsory Courses

Verplicht keuze van 4 uit deze 8 vakken: X_435663, X_435664, X_435665, X_435666,
X_435667, X_435668, X_435669, X_435653

Vakken:

Naam	Periode	Credits	Code
Literature Thesis and Colloquium Chemistry - Organic Chemistry	Ac. Jaar (september)	12.0	XM_432583

Research Variant Molecular Simulation & Photonics

The programme consists of 120 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.

Master Coordinator:

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Opleidingsdelen:

Compulsory Choice Ethics and Portfolio academic Skills

Students need to select a total of 6 credits 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
English Academic Course	Periode 2+3, Periode 5+6	3.0	XMU_437028
Science in Perspective	Periode 4+5	6.0	XMU_437030
Teaching Assistant	Ac. Jaar (september)	3.0	XM_432741
Teaching Assistant	Ac. Jaar (september)	6.0	XM_432742
Tutoring Students	Periode 2	3.0	X_432625

Compulsory Optional Course Research project (Major) including report

Compulsory choice of at least 42 credits. Optional extension of 6, 12 or 18 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 Research Project Chemistry Molecular Simulation and Photonics - Extension	Ac. Jaar (september)	18.0	XM_432684
Master Research Project Molecular Simulation and Photonics	Ac. Jaar (september)	42.0	XM_432681
Master Research Project Molecular Simulation and Photonics - ext	Ac. Jaar (september)	6.0	XM_432682
Master Research Project Molecular Simulation and Photonics - ext	Ac. Jaar (september)	12.0	XM_432683

Literature Thesis and Colloquim

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
Literature Thesis and Colloquium Chemistry - Physical Chemistry	Ac. Jaar (september)	12.0	XM_432582
Literature Thesis and Colloquium Chemistry - Theoretical Chemistry	Ac. Jaar (september)	12.0	XM_432584
Literature thesis and Colloquium Chemistry Molecular Simulation and Photonics	Ac. Jaar (september)	12.0	XM_432679

Compulsory Optional Courses

Choose 2 of 4

Vakken:

Naam	Periode	Credits	Code
Advanced Experimental Techniques	Periode 6	6.0	XM_432662
Ultrafast Laser Physics	Periode 4	6.0	X_422556
Understanding Molecular Simulation	Periode 3	6.0	XMU_432703
Understanding Quantum Chemistry	Periode 2	6.0	X_422557

Recommended Optional Courses Computational Chemistry

The subject options of 36, 30, 24 or 18 credits can be completed with courses in
- Computational Chemistry
- Physical Chemistry
- Physcis of Light & Matter
- Physicss of Life & Health

Below the recommended courses in Computational Chemistry.

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
Ab Initio Molecular Dynamics	Periode 5	6.0	XMU_435635
Advanced Quantum Chemistry	Ac. Jaar (september)	6.0	XM_432847
Advanced Quantum Chemistry	Ac. Jaar (september)	12.0	XM_432848
Applied Theoretical Chemistry	Periode 4	6.0	X_435612
Biomolecular Simulations	Periode 4	6.0	XMU_437019
Density Functional Theory for Chemists	Ac. Jaar (september)	12.0	XM_435112
Density Functional Theory for Chemists	Ac. Jaar (september), Periode 4	6.0	XM_435111
Medical Imaging	Periode 4	6.0	XMU_428526
Molecular Photodynamics		3.0	XM_432701
Numerical Techniques	Periode 4+5	6.0	XMU_420082
Scientific Computing and Programming	Periode 2	6.0	X_435076
Supramolecular Chemistry and Nanomaterials	Periode 1	6.0	XMU_435653
Transport Phenomena		6.0	XMU_420075

Compulsory Courses

Students need to follow two courses in period 1 of year 1 and one course in period 1 of year 2.

Vakken:

Naam	Periode	Credits	Code
Quantum Theory of Molecules and Matter	Periode 1	6.0	XMU_428517
Statistical Theory of Complex Molecular Systems	Periode 1	6.0	XMU_428520

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
Compulsory choice:
b1. Science project (incl literature research and research skills)24 EC
or b2. Researching science research 12 EC and Track courses 12 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) or the combination of Researching science research (12 EC) and Track courses (12 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
- Compulsory Choice of 24 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 EC from 1 of the following Science courses:
L&H:
Biomedical modeling and simulation 6 EC
Principles of Pharmaceutical Sciences/Pharmacochemistry 6 EC
Protein science 6 EC
Innovation in medical technology 6 EC

Chemical biology 6 EC
Green chemistry 6 EC

E&S:
Biosolar cells 6 EC
Chemical biology 6 EC
Green chemistry 6 EC
Photovoltaics 6 EC
Project sustainable future 6 EC
Materials for energy and environmental sustainability 12 EC

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
Organic Photovoltaics	Periode 5	6.0	X_422590
Principles of Pharmaceutical Sciences / Pharmacochemistry	Periode 1	6.0	X_435675
Project Sustainable Future	Periode 6	6.0	X_432784
Protein Science	Periode 1	6.0	AM_470145

Compulsory Choice of 24 EC

Vakken:

Naam	Periode	Credits	Code
Business & Innovation Project	Ac. Jaar (september)	24.0	XM_432845
Materials for energy and environmental sustainability	Periode 4+5	12.0	X_432850
Researching science research	Periode 4+5	12.0	X_432849
Science project	Ac. Jaar (september)	24.0	XM_422591

Recommended optional Courses

The students have to choose elective courses of 18 EC at the MSc level which have to be approved by the Examination Committee.

Vakken:

Naam	Periode	Credits	Code
Science and Society in Historical Perspective	Periode 4+5	6.0	X_400424
Technology and Innovation Processes	Periode 2	6.0	E_BA_TIP

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
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
SBI Research Methodology	Periode 1	6.0	X_432846
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
BioSolar Cells	Periode 1	6.0	X_428531
Catalysis for sustainable energy	Periode 4	6.0	XMU_437027
Coordination and Organometallic Chemistry	Periode 2	6.0	XMU_435664
Emergent Energy Materials	Periode 1	6.0	XMU_428571
Energy and Climate Change; Science, Policy and Economics	Periode 2	6.0	X_428568
Environmental Chemistry	Periode 1	6.0	XMU_437004
Green Chemistry	Periode 1	6.0	X_430557
Heterogeneous Catalysis	Periode 3	6.0	XMU_428013

Homogeneous Catalysis	Periode 5	6.0	XMU_435668
Open Innovation in Science and Sustainability	Periode 2	6.0	X_422598
Organic Photovoltaics	Periode 5	6.0	X_422590
Photosynthesis and Energy	Periode 5	6.0	X_422553
Photovoltaics	Periode 4	6.0	XMU_428516

Compulsory Choice Ethics and Portfolio Academic skills

Compulsory choice of at least 6 ec

Vakken:

Naam	Periode	Credits	Code
Science in Perspective	Periode 4+5	6.0	XMU_437030
Tutoring Students	Periode 2	3.0	X_432625

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	XM_422593
Master Project SfES	Ac. Jaar (september)	36.0	XM_422594
Master Project SfES	Ac. Jaar (september)	42.0	XM_422595
Master Project SfES	Ac. Jaar (september)	48.0	XM_422596
Master Project SfES	Ac. Jaar (september)	54.0	XM_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	XM_432785
Project Sustainable Future	Periode 6	6.0	X_432784

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 EC (18 EC compulsory courses; 12 EC optional courses and 30 EC 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 EC Chemistry courses. The student has to discuss the programme with the master coordinator of the chosen specialisation.

Opleidingsdelen:

- Optional Courses Social Variant
- Compulsory Courses Social Variant

Optional Courses Social Variant

Compulsory choice of 18 credits

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	3.0	AM_1180
Disability and Development	Periode 2	6.0	AM_470588
Epidemiology	Periode 3	3.0	AM_1179
Health, Globalisation and Human Rights	Periode 2	6.0	AM_470818
Policy, Politics and Participation	Periode 2	6.0	AM_470589
Research methods for analyzing complex problems	Periode 1	6.0	AM_1182
Science Museology	Periode 3	6.0	AM_470590
Societal entrepreneurship in health and life sciences	Periode 1	6.0	AM_470575

Compulsory Courses Social Variant

In addition to the courses below a total of at least 18 EC of track specific courses has to be chosen in consultation with the master coordinator.

Vakken:

Naam	Periode	Credits	Code
Analysis of Governmental Policy	Periode 1	6.0	AM_470571
Colloquium and Literature Thesis	Ac. Jaar (september)	6.0	XM_432580
Communication, Organization and Management	Periode 2	6.0	AM_470572
Internship Societal Specialisation	Ac. Jaar (september)	30.0	AM_471147
Master Research Project Society Oriented Variant	Ac. Jaar (september)	36.0	XM_432588

(Bio)Molecular Spectroscopy

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

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017/zoek-vak

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

Ab Initio Molecular Dynamics

Vakcode	XMU_435635 (435635)
Periode	Periode 5
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	500

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2015-2016/zoek-vak/vak/15045

Doelgroep
mCh-MSP

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

Advanced Experimental Techniques

Vakcode	XM_432662 (432662)
Periode	Periode 6
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege, Practicum
Niveau	500

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

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

Advanced Quantum Chemistry

Vakcode	XM_432847 ()
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. L. Visscher
Examinator	prof. dr. L. Visscher
Niveau	500

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

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

Advanced Quantum Chemistry

Vakcode	XM_432848 ()

Periode	Ac. Jaar (september)
Credits	12.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. L. Visscher
Examinator	prof. dr. L. Visscher
Niveau	500

Doel vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

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

Advanced Separation Sciences

Vakcode	XMU_432844 ()
Periode	Periode 3
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017/zoek-vak

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

Advanced Spectroscopy

Vakcode	X_432767 ()
Periode	Periode 6
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. F. Ariese
Examinator	dr. F. Ariese
Docent(en)	dr. F. Ariese
Lesmethode(n)	Hoorcollege
Niveau	500

Doel vak
http://studiegids.uva.nl/xmlpages/page/2016-2017/zoek-vak

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

Advanced Statistics for Analytical Chemistry

Vakcode	XMU_437589 ()
Periode	Periode 5
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017/zoek-vak

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

Analysis of Governmental Policy

Vakcode	AM_470571 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. O.E. Popa
Examinator	dr. O.E. Popa
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 psychologal side as from the more social structures and their influence on a deliberative democracy.
The course contains several lectures on theoretical concepts and models concerning policy analysis. Furthermore you will be challenged, under supervision, to apply and practice these concepts and models in the project assignment. From the very first day, you will be part of a project team of about ten students. You are confronted with a real policy problem from an external commissioning institution (e. g. a non-governmental organization, a Ministry, an advisory council). Within those 4 weeks you will collect data by literature review and interviews and conduct an interdisciplinary analysis on the basis of which you provide an advice. Specific attention is paid to working in a project team and team building. At the end of the course, you prepare an advisory report. On the last day of the course you present the report to the representative of the external institution who commissioned the project. In that presentation your team will highlight the main results of your analysis and defend the recommendations you propose.

Onderwijsvorm
Analysis of Governmental Policy is a parttime course of eight weeks (6 ECTS). The most recent course schedule is to be found on Blackboard. Tuition methods include lectures, training workshops, and self-study. The different elements have the following study time:
- lectures: 15 hours
- project and self-study: remaining hours (including coach meetings)
- 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%)). All parts have 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 research design made and lessons learned from the first compulsory MPA course: Research Methods for Analyzing Complex Problems

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.

Intekenprocedure
Additional information about the schedule for work groups is available in BlackBoard.

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 tutors.

Applied Theoretical Chemistry

Vakcode	X_435612 (435612)
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. F.M. Bickelhaupt
Examinator	prof. dr. F.M. Bickelhaupt
Docent(en)	prof. dr. F.M. Bickelhaupt, dr. C. Fonseca Guerra
Lesmethode(n)	Hoorcollege, Onderwijs, Computerpracticum
Niveau	500

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

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

Bio-analysis & Clinical Diagnostics

Vakcode	X_432765 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H. Lingeman
Examinator	dr. H. Lingeman
Docent(en)	dr. H. Lingeman
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak

Giving a clear account on the instrumental bio-analytical techniques and strategies in bio-analysis an clinical diagnostics.

Inhoud vak
This basic course on bio-analytical and clinical chemistry is focusing on decision trees (strategic decisions) that can be used during the method development and optimization of analytical procedures to determine both endogenous and exogenous compounds in complex biological samples. Approaches and procedures with respect to sampling, sample preparation, separation, spectroscopy, electrochemistry, as well as immunological and enzymatic procedures will be dealt with. Case studies will be used to clarify the decisions that have to be taken.

Onderwijsvorm
Lectures and tutorials.

Toetsvorm
Written or oral examination.

Literatuur
Hand-outs (electronically available).

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

Doelgroep
mCH-AS, mDDS, mMNS

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, 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 small groups, 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

Biomolecular Simulations

Vakcode	XMU_437019 (437019)
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege
Niveau	500

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

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

Bio-Organic Chemistry

Vakcode	X_435669 (435669)
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. E. Ruijter
Examinator	dr. E. Ruijter
Docent(en)	prof. dr. ir. R.V.A. Orru
Lesmethode(n)	Hoorcollege
Niveau	400

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

Overige informatie
This course is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-science@uva.nl, +31 (0)20 525 7100. Enrolment via https://m.sis.uva.nl/vakaanmelden is required. For courses taught in period 1 and period 2, enrolment via https://datanose.nl/#specialenrol is required.

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, dr. R.N. Frese
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

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

For courses taught in period 1 and period 2, enrolment via https://datanose.nl/#specialenrol is required.

Biosystems Data Analysis

Vakcode	XMU_437001 (437001)
Periode	Periode 3
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017/zoek-vak/vak/26299

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

Business & Innovation Project

Vakcode	XM_432845 ()
Periode	Ac. Jaar (september)
Credits	24.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.P. Dekker
Examinator	dr. J.P. Dekker
Niveau	400

Doel vak
This project is an alternative for the Science Project (X-422591), but only for those students who have performed a science-based project during their bachelor program, like students with completed chemistry, physics or related bachelors programs.

Course objective is similar to that of the Science Project, but a science base is not required.

Inhoud vak
See Science Project, except that this project is based on business and innovation instead of science.

Toetsvorm
Report and presentation

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

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

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

The newly acquired knowledge is tested via an assignment (during which students will write either a personal career business plan or a 'real' business plan) (40% of the total grade), a written exam (40% of the total grade), and two computer seminars (both counting for 10% of the final grade).

Onderwijsvorm
Lectures: +-50 h
Computer seminars: 7,5 h
Work on assignment and self-study: +- 40h

Toetsvorm
Written exam: 40%
Personal Business Plan: 40%
Computer seminars (2): 20%
All parts have to be passed successfully.

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

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, companies/organisations:
• Robert Al, TU Eindhoven
• Tamar Weenen, VU university
• Esther Pronker, RIVM
• Patrick de Boer & Jochem Bosschenbroek, Ttopstart BV
• Bart van Weezenbeek, Vereenigde
• Bart Bergstein, Forbion Capital partners
• Michael Mellink & Majorie Soeter, Odgers Berndtson: international executive search
• Marga Janse, Innovatief LerenLeren BV
• Yp Kroon & Peter van Dongen, NL Octrooicenrtum
• Jeroen Dekker, Price Waterhouse Coopers
• Arjan Bisseling, AsjesBisseling Belastingadviseurs

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:

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

Inhoud vak
The LSI landscape is shown in several ways:
1. Understanding the Pharma Biotech and Health Care sectors and its primary and secondary drivers, including the contributing sciences
2. Understanding relevant business, value chain and innovation models that are common in these industries and sectors
3. Understanding typical product life-cycle dynamics in the Pharma and Biotech and related Health sectors
4. Understanding the relative contribution and position of Genomics, Proteomics and other scientific specialization areas in the future of Health and Life Sciences
5. Understanding current product categories and the future of diagnosis, therapy and prevention
In addition to lectures on the above topics, students will be handed certain texts and articles that illustrate the `State of the Art' in the LSI sector from both a product development as well as from a business development standpoint.
As a result the student will get insight into the business decisions and dynamic that are linked to basic bio-scientific research from inception through to product development and commercialization. The course thus aims to provide a general overview of how life science and business are interwoven in everyday industrial practice.

Two `real-life' cases will be discussed and students will get a group assignment in which the cases will have to be analyzed and certain questions will have to be answered. Each group writes a short analysis and subsequently presents this in front of the whole group. Subsequently, each student will engage in a personal assignment as described above. The outputs will consist of a presentation before the whole group. The aim is to provide as real life a setting as is possible.

Onderwijsvorm
A mix of lectures, guest lectures, Pharma sector casework and related assignments. Individual coaching on the business planning excercise. 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 comparible

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$gt;

Catalysis for sustainable energy

Vakcode	XMU_437027 ()
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	500

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

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

Chemical Analysis for Forensic Evidence

Vakcode	XMU_437003 (437003)
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege
Niveau	500

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017/zoek-vak

Overige informatie
This course is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-science@uva.nl, +31 (0)20 525 7100. Enrolment via https://m.sis.uva.nl/vakaanmelden is required. For courses taught in period 1 and period 2, enrolment via

https://datanose.nl/#specialenrol is required.

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 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 or Principles of Pharmaceutical Sciences, Signal Transduction in Health and Disease, or equivalent for mBMS students and students with

Bsc SBI or Chemistry.

With a BSc SBI or Chemistry, please contact prof. Leurs before registration on your eligibility to participate.

Doelgroep
mBMS-BC, mCh-SBI (2nd year), mDDS-BCCA, mDDS-CMCT, mDDS-DD&S, mDDS-DDSA, mDDS-DDTF, mDDS-C-var, mDDS-E-var, mDDS-M-var, mPhys-SBI (2nd year)

Intekenprocedure
Please register as soon as possible online.

Overige informatie
Presence is obliged at predefined moments of the course (e.g. kick-off meeting, computer practical, presentation session, examination) for finishing the course successfully.

Clinical Development and Clinical Trials

Vakcode	AM_1180 ()
Periode	Periode 3
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	drs. A.M.G. Neevel BSc
Examinator	prof. dr. H.J.H.M. Claassen
Docent(en)	prof. dr. H.J.H.M. Claassen
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Doel vak
- to gain knowledge and insight into the function clinical trials in today's healthcare system
- to gain knowledge and insight into the design of clinical trials
- to gain knowledge and insight into the conduct of clinical trials, including the applying rules and regulations (including ICH-GCP)
- to gain knowledge and insight into and critically reflect on the roles, tasks and responsibilities of the stakeholders involved in clinical trials
- to gain insight into challenges in clinical development as well as in strategies to deal with these challenges
- to learn where and how to look up rules and regulations

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

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

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

Onderwijsvorm
Lectures: +-35 h
Self study: +- 40 h

Toetsvorm
Written exam: 100%

Literatuur
Arezina R, Wang D. (2006). Clinical Trials: A practical guide to design, analysis and reporting. London: Remedica.
(Additional reading will be provided via Blackboard and will serve as background reading for the lectures).

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/companies:
• Eric Klaver, FourPlus Clinical

Colloquium and Literature Thesis

Vakcode	XM_432578 (432578)
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. ir. R.V.A. Orru
Examinator	prof. dr. ir. R.V.A. Orru
Niveau	600

Doel vak
please contact the mastercoordinator of your track

Colloquium and Literature Thesis

Vakcode	XM_432579 (432579)
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels

Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. ir. R.V.A. Orru
Examinator	prof. dr. ir. R.V.A. Orru
Niveau	600

Doel vak
please contact the mastercoordinator of your track

Colloquium and Literature Thesis

Vakcode	XM_432581 (432581)
Periode	Ac. Jaar (september)
Credits	12.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H. Lingeman
Examinator	dr. H. Lingeman
Niveau	600

Doel vak
Literature study on a topic related to biomolecular analysis.

Inhoud vak
The topic will be chosen in close cooperation and with approval of the master coordinator.

Onderwijsvorm
Selfstudy and discussion sessions.

Toetsvorm
Report and presentation.

Doelgroep
mCh-AS

Colloquium and Literature Thesis

Vakcode	XM_432580 (432580)
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. ir. R.V.A. Orru
Examinator	prof. dr. ir. R.V.A. Orru
Niveau	600

Doel vak
please contact the mastercoordinator of your track

Communication, Organization and Management

Vakcode	AM_470572 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. E. Muniz Pereira Urias
Examinator	dr. E. Muniz Pereira Urias
Docent(en)	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 lecturers on aspects as motivation, managing interpersonal behaviour, leadership, communication and developing and changing organisations. The speakers explain theories from literature and relate them to their practical experiences. 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
Training workshops 16 hours
Self-study and writing project assignment: remaining hours.

Toetsvorm
Written exam (60%;) and assignment (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/discussions is indispensable

Lecturers:
dr. M.J. Kishna
guest lectures will be announced on Blackboard

Coordination and Organometallic Chemistry

Vakcode	XMU_435664 (435664)
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege
Niveau	400

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

Overige informatie
This course is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-science@uva.nl, +31 (0)20 525 7100.
Enrolment via https://m.sis.uva.nl/vakaanmelden is required.
For courses taught in period 1 and period 2, enrolment via https://datanose.nl/#specialenrol is required.

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

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

Overige informatie
This course is part of the MSc Physics and Astronomy (joint degree) and is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-science@uva.nl, +31 (0)20 525 7100.
Enrolment via https://m.sis.uva.nl/vakaanmelden is required.

Density Functional Theory for Chemists

Vakcode	XM_435112 (435112)
Periode	Ac. Jaar (september)
Credits	12.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. F.M. Bickelhaupt
Examinator	prof. dr. F.M. Bickelhaupt
Niveau	500

Doel vak
Understanding basic concepts of Density Functional Theory (DFT), in particular, Kohn-Sham DFT, and its application to understanding and predicting chemical bonding, molecular structure, and reactivity.

Inhoud vak
Part I (6 ECTS): Electron density, Hole functions, Electron density as basic variable instead of the wavefunction, Hohenberg-Kohn theorems, Kohn-Sham approach, Approximate exchange-correlation functionals, Basic machinery of DFT computer programs. Part II (6 ECTS): Molecular structure, Vibrational frequencies, Thermochemistry, Hydrogen bonds, Kohn-Sham molecular orbital (MO) model of the electronic structure and chemical bond, Chemical reactivity.

Onderwijsvorm
zelfstudie

Toetsvorm
Oral examination.

Literatuur
Parts of: (a) W. Koch en M. C. Holthausen, A Chemist's Guide to Density Functional Theory; Sec. Ed.; Wiley-VCH Verlag: Weinheim, 2000.; (b) F.M. Bickelhaupt, E.J. Baerends, Kohn-Sham Density Functional Theory: Predicting and Understanding Chemistry, in: Rev. Comput. Chem.; K.B. Lipkowitz, D.B. Boyd, Eds.; Wiley-VCH: New York, Vol. 15; (c) Other selected tutorial reviews (in consultation).

Vereiste voorkennis
BSc course Quantumchemie, BSc course Computational Chemistry

Doelgroep

mCh, mPhar

Overige informatie
Period 1, 2, 3, 4, 5, 6: in consultation with the lecturer

Docent:
Prof. Dr. F. M. Bickelhaupt

Density Functional Theory for Chemists

Vakcode	XM_435111 (435111)
Periode	Ac. Jaar (september), Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. F.M. Bickelhaupt
Examinator	prof. dr. F.M. Bickelhaupt
Docent(en)	prof. dr. F.M. Bickelhaupt
Lesmethode(n)	Hoorcollege
Niveau	500

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

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

Didactiek 1

Vakcode	O_MLDIDAC_1 ()
Periode	Periode 1
Credits	6.0
Voertaal	Nederlands
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	C.L. Geraedts
Examinator	C.L. Geraedts
Docent(en)	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, ir. E.J.F. Scheringa, drs. I. Pauw, drs. C.D.P. van Oeveren, drs. S. Donszelmann, drs. B. Klein, dr. H.B. Westbroek, C.L. Geraedts, dr. A.A. Kaal, dr. A. Handelzalts, drs. K.L. Schaap, dr. B. de Vries, drs. A.J.C. Monquil, dr. J.G.M. van der Aalsvoort, drs. J.B. Penninx, W. Maas, F.L. de Vries MSc, drs. H. Stouthart, drs. E.D. van Noort, drs. N.H. Ypenburg, drs. J. Quartel
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Doel vak
De cursus Didactiek 1 is onderdeel van de eerste fase (fase I) van de Universitaire Lerarenopleiding (ULO) van de VU, en loopt parallel aan de cursus Praktijk 1. De cursus is breed van opzet en omvat verschillende onderdelen die in samenhang worden aangeboden: algemene didactiek (AD), vakdidactiek (VD) en peergroup (PG).

Aan het eind van de cursus heeft de student de nodige basale algemeen didactische en vakdidactische bagage aan te reiken die nodig is voor het handelen als docent in simpele en overzichtelijke situaties op niveau van één les. Hierbij wordt nadrukkelijk aangesloten bij de ontwikkelingsfase waarin de docent-in-opleiding (dio) zich bevindt (zie inhoud).

Inhoud vak
De cursus is geordend rondom zogeheten kernpraktijken die fundamenteel zijn voor het beroep van docent. Bij Didactiek 1 staan de volgende kernpraktijken centraal: (1) contact maken, (2) de les starten en aandacht richten, (3) krediet opbouwen en uitgeven, (4) de les voorbereiden, (5) sturen en corrigeren en (6) volledige instructie geven en de les afsluiten. De reikwijdte van het didactisch denken en handelen is in deze eerste fase meestal nog beperkt tot één les.
De genoemde kernpraktijken komen expliciet aan de orde bij AD. Bij VD wordt aangesloten bij deze kernpraktijken en wordt de vertaalslag gemaakt naar het eigen (school)vak. Daarnaast worden bij VD belangrijke vakdidactische concepten en werkwijzen geïntroduceerd

Bij PG staat de eigen onderwijspraktijk van de docent-in-opleiding (dio) centraal. Concrete vragen en situaties uit de praktijk vormen aanleiding tot analyse en reflectie. Waar bij AD en VD de nadruk ligt op de rollen van de uitvoerende en ontwerpende docent en pedagoog, wordt bij PG nadrukkelijk vorm gegeven aan de rol van onderzoekende professional.

De ervaring leert dat de kernpraktijken die bij Didactiek 1 centraal staan bij de meeste dio’s uitgebreid aan de orde komen tijdens het eerste deel van de praktijkstage (Praktijk 1). Alle inhoudscomponenten uit deze cursus worden tijdens de bijeenkomsten en in verwerking verbonden met de werkplekpraktijk van de student. De dio en de werkplekbegeleider krijgen ook suggesties voor (observatie)opdrachten die kunnen bijdragen aan de ontwikkeling van de competenties die bij deze kernpraktijken horen.

Onderwijsvorm
Alle onderwijs vindt plaats op de instituutsdag (maandag). Studenten zijn de hele dag aanwezig. In de ochtend is er een hoor/werkcollege AD, waarbij dio’s van verschillende vakken samen zitten. De colleges AD worden steeds verzorgd door een tweetal docenten. In de middag is er een werkcollege VD onder begeleiding van de vakdidacticus. Deze colleges worden samen met dio’s van hetzelfde vak in verschillende samenstellingen (homogeen en heterogeen) gevolgd.

Tenslotte zijn er, verspreid over de periode, drie PG bijeenkomsten, waarbij dio’s van verschillende vakken in kleine groepen en onder begeleiding de eigen onderwijspraktijk onder de loep nemen en eventuele concerns daarbij bespreken.

Bij alle onderdelen (AD, VD en PG) wordt een actieve houding van de

student gevraagd, zowel tijdens de bijeenkomsten als daarbuiten. Regelmatig worden er verwerkingsopdrachten gegeven, waar individueel of in groepsverband aan wordt gewerkt. Deze opdrachten worden formatief geëvalueerd, onder andere door middel van (peer)feedback.

Toetsvorm
Didactiek 1 wordt afgesloten met een geschreven mini-proef waarin de studenten demonstreren dat zij één les kunnen ontwerpen en uitvoeren en kunnen reflecteren op de manier waarop voorbereiding, uitvoer en afronding hebben plaatsgevonden. De proef bestaat uit een lesontwerp (incl. verantwoording op basis van praktijk en theorie, en eigen leerdoelen bij deze les), een videocompilatie (15 min.) van de gegeven les en een terugblik op de les. Bij het ontwerpen en uitvoeren van de les staan de kernpraktijken behandeld in de colleges algemene didactiek en vakdidactiek centraal (met een focus op de les en de leerling). De terugblik op ontwerp en uitvoering vindt plaats aan de hand van de reflectiecirkel van Korthagen, de perspectieven van een docent als professional, ontwerper, uitvoerder, pedagoog en teamlid en de daarbij behorende relevante theorie. De proef wordt beoordeeld aan de hand van een beoordelingsmodel gerelateerd aan de rubrics die voor elk van de docentperspectieven zijn geformuleerd voor fase 1.

Literatuur
Bij deze cursus worden de volgende algemeen didactische handboeken gebruikt:
- Ebbens, S. & Ettekoven, S. (2012). Effectief leren – basisboek. Groningen: Noordhoff Uitgevers B.V.
- Korthagen, F. & Lagerwerf, B. (2014). Een leraar van klasse. Den Haag: Boom Lemma Uitgevers
- Teitler, P. (2013). Lessen in orde. Bussum: Coutinho.
- Kohnstamm, R. (2014). Kleine ontwikkelingspsychologie: III de puberjaren. Houten: Bohn Stafleu van Loghum.

Behalve van bovenstaande literatuur wordt veelvuldig gebruik gemaakt van relevante en actuele wetenschappelijke literatuur. Deze artikelen worden tijdens de cursus ter beschikking gesteld. De literatuur die bij VD gebruikt wordt is afhankelijk van het schoolvak waarvoor wordt opgeleid.

Overige informatie
Beheersing van de inhoud van het desbetreffende schoolvak wordt als voorkennis verondersteld.

Didactiek 2

Vakcode	O_MLDIDAC_2 ()
Periode	Periode 2+3
Credits	6.0
Voertaal	Nederlands
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	drs. L.J. van Well-van Grootheest
Examinator	drs. L.J. van Well-van Grootheest

Docent(en)	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, ir. E.J.F. Scheringa, drs. I. Pauw, drs. C.D.P. van Oeveren, drs. S. Donszelmann, drs. B. Klein, dr. H.B. Westbroek, C.L. Geraedts, dr. A.A. Kaal, dr. A. Handelzalts, drs. K.L. Schaap, dr. B. de Vries, drs. A.J.C. Monquil, dr. J.G.M. van der Aalsvoort, drs. J.B. Penninx, W. Maas, F.L. de Vries MSc, drs. H. Stouthart, drs. E.D. van Noort, drs. N.H. Ypenburg, drs. J. Quartel
Lesmethode(n)	Werkgroep, Hoorcollege
Niveau	400

Doel vak
De cursus Didactiek 2 is onderdeel van de tweede fase (fase II) van de Universitaire Lerarenopleiding (ULO) van de VU, en loopt parallel aan de cursus Praktijk 2. De cursus omvat verschillende onderdelen die in samenhang worden aangeboden: algemene didactiek (AD), vakdidactiek (VD) en peergroup (PG).

Aan het eind van de cursus heeft de student de nodige algemeen didactische en vakdidactische bagage aan te reiken die nodig is voor het handelen als docent op het niveau van een afgebakende onderwijs leerproces waarbij op basis van bestaande lesmaterialen wordt gewerkt. Hierbij wordt nadrukkelijk aangesloten bij de ontwikkelingsfase waarin de docent-in-opleiding (dio) zich bevindt (zie inhoud).

Inhoud vak
Didactiek 2 is geordend rondom een aantal voor het beroep van docent fundamentele kernpraktijken. Bij Didactiek 2 staan de volgende kernpraktijken centraal: (1) leerprocessen zichtbaar maken, (2) leerprocessen bevorderen, (3) leerprocessen toetsen, (4) communiceren en leiding geven, (5) leerlingen verantwoordelijkheid geven (van docentgestuurd naar leerlinggestuurd) en (6) aandacht geven aan verschillen. Ten opzichte van de cursus Didactiek 1 wordt de focus verlegd van de (individuele) les naar het leerproces van de leerling. De reikwijdte van het didactisch denken en handelen wordt daarmee ook groter: er wordt een begin gemaakt met het ontwerpen en uitvoeren van reeksen van lessen.

De genoemde kernpraktijken komen expliciet aan de orde bij AD. Bij VD wordt aangesloten bij deze kernpraktijken en wordt de vertaalslag gemaakt naar het eigen (school)vak. Daarnaast worden bij VD belangrijke vakdidactische concepten en werkwijzen geïntroduceerd.

Bij PG staat wederom de eigen onderwijspraktijk van de dio centraal. Waar bij AD en VD de nadruk ligt op de rollen van de uitvoerende en ontwerpende docent en pedagoog, wordt bij PG nadrukkelijk vorm gegeven aan de rol van reflectieve onderzoekende professional . De samenhang tussen Didactiek 2 en Praktijk 2 komt onder andere tot stand doordat de dio en de werkplekbegeleider op school suggesties krijgen voor (observatie)opdrachten die kunnen bijdragen aan de ontwikkeling van de competenties die bij deze kernpraktijken horen. Alle inhoudscomponenten uit deze cursus worden tijdens de bijeenkomsten en in verwerking verbonden met de werkplekpraktijk van de student

In de laatste weken van de cursus is nadrukkelijker ruimte voor de eigen leervragen en behoefte van de student. Er worden keuzeworkshops aangeboden rondom uiteenlopende (vak)didactische thema’s. Ook zijn er

bijeenkomsten waarin dio's die veel moeite hebben met (o.a.) klassenmanagement extra coaching kunnen krijgen of extra aandacht verdienen op het gebied van bijvoorbeeld lesontwerp.

Onderwijsvorm
Alle onderwijs vindt plaats op de instituutsdag (maandag). Studenten zijn de hele dag aanwezig. In de ochtend is er een hoor/werkcollege AD, waarbij dio's van verschillende vakken samen zitten. De colleges AD worden steeds verzorgd door een tweetal docenten. In de middag is er een werkcollege VD onder begeleiding van de vakdidacticus. Deze colleges worden samen met dio's van hetzelfde vak in verschillende samenstellingen (homogeen en heterogeen) gevolgd .

Tenslotte zijn er, verspreid over de periode, drie PG bijeenkomsten, waarbij dio's van verschillende vakken in kleine groepen en onder begeleiding de eigen onderwijspraktijk onder de loep nemen en eventuele concerns daarbij bespreken.
Bij alle onderdelen (AD, VD en PG) wordt een actieve houding van de student gevraagd, zowel tijdens de bijeenkomsten daarbuiten. Regelmatig worden er verwerkingsopdrachten gegeven, waar individueel of in groepsverband aan wordt gewerkt. Deze opdrachten worden formatief geëvalueerd, onder andere door middel van (peer)feedback.

Toetsvorm
Didactiek 2 wordt afgesloten met een geschreven midi-proef waarin destudenten demonstreren dat zij een korte lessenreeks kunnen ontwerpen en (deels) uitvoeren en kunnen reflecteren op de manier waarop voorbereiding, uitvoer en afronding hebben plaatsgevonden. De proef bestaat uit een docentenhandleiding bij bestaand lesmateriaal, (incl. een globale planning, twee uitgewerkte lesontwerpen, verantwoording op basis van praktijk en theorie, en eigen leerdoelen bij deze les), een videocompilatie (15 min.) van de gegeven lessen en een terugblik op ontwerp en uitvoering. Bij het ontwerpen en uitvoeren van de les staan de kernpraktijken behandeld in de colleges algemene didactiek en vakdidactiek centraal (met een focus op de leerling en het leerproces). De terugblik op ontwerp en uitvoering vindt plaats aan de hand van de reflectiecirkel van Korthagen, de perspectieven van een docent als professional, ontwerper, uitvoerder, pedagoog en teamlid en de daarbij behorende relevante theorie. De proef wordt beoordeeld aan de hand van een beoordelingsmodel gerelateerd aan de rubrics die voor elk van de docentperspectieven zijn geformuleerd voor fase 2.

Literatuur
Bij deze cursus worden de volgende algemeen didactische handboeken gebruikt:
- Ebbens, S. & Ettekoven, S. (2012). Effectief leren – basisboek. Groningen: Noordhoff Uitgevers B.V.
- Korthagen, F. & Lagerwerf, B. (2014). Een leraar van klasse. Den Haag: Boom Lemma Uitgevers
- Teitler, P. (2013). Lessen in orde. Bussum: Coutinho.
- Kohnstamm, R. (2014). Kleine ontwikkelingspsychologie: III de puberjaren. Houten: Bohn Stafleu van Loghum.

Daarnaast wordt veelvuldig gebruik gemaakt van relevante en actuele wetenschappelijke literatuur. Deze artikelen worden tijdens de cursus ter beschikking gesteld. De literatuur die bij VD gebruikt wordt is afhankelijk van het schoolvak waarvoor wordt opgeleid.

Overige informatie
Beheersing van de inhoud van het desbetreffende schoolvak wordt als voorkennis verondersteld.
Voorwaardelijk voor afronding van Didactiek 2: een voldoende beoordeling van Didactiek 1.

Didactiek 3

Vakcode	O_MLDIDAC_3 ()
Periode	Periode 1+2+3, Periode 4+5+6
Credits	9.0
Voertaal	Nederlands
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	dr. B. de Vries
Examinator	dr. B. de Vries
Docent(en)	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, ir. E.J.F. Scheringa, drs. I. Pauw, drs. C.D.P. van Oeveren, drs. S. Donszelmann, drs. B. Klein, drs. W. Jongejan, dr. H.B. Westbroek, C.L. Geraedts, dr. A.A. Kaal, dr. A. Handelzalts, drs. K.L. Schaap, dr. B. de Vries, drs. A.J.C. Monquil, dr. J.G.M. van der Aalsvoort, drs. J.B. Penninx, W. Maas, F.L. de Vries MSc, drs. H. Stouthart, drs. E.D. van Noort, drs. N.H. Ypenburg, drs. J. Quartel
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Doel vak
De cursus Didactiek 3 is onderdeel van de derde en laatste fase (fase III) van de Universitaire Lerarenopleiding (ULO) van de VU, en loopt parallel aan de cursussen Praktijk 3 en POO 2. De omvang van de cursus is een heel semester.

Aan het eind van de cursus heeft de student de verdiepende pedagogische, didactische en vakdidactische bagage aan te reiken die nodig is voor het handelen als docent in complexe situaties. Hierbij wordt nadrukkelijk aangesloten bij de ontwikkelingsfase waarin de docent-in-opleiding (dio) zich bevindt (zie inhoud).

Inhoud vak
Het eerste blok van de cursus Didactiek 3 is weer geordend rondom een aantal voor het beroep van docent fundamentele kernpraktijken, namelijk: (1) differentiëren, (2) toetsen, (3) gedrags- en leerproblemen herkennen, (4) omgaan met gedrags- en leerproblemen, (5) mentor zijn en (6) een plek in de schoolorganisatie innemen.
De cursussen Didactiek 1 en 2 vormen samen het basisdeel van de Universitaire Lerarenopleiding (ULO); de cursus Didactiek 3 moet gezien worden als het verdiepingsdeel. In Didactiek 3 komen meer complexe thema’s en kernpraktijken aan de orde. Het (vak)didactisch denken en handelen strekt zich nu ook uit over de lange termijn: er is bijvoorbeeld uitgebreid aandacht voor het vorm geven aan leerlijnen en het omgaan met gedrags- en leerproblemen. Ook wordt de dio nadrukkelijker uitgedaagd om een eigen visie op onderwijs vorm te geven en uit te dragen. Zo is de lesmethode niet langer leidend, maar wordt van dio’s in toenemende mate verwacht zelf invulling te geven aan de

inhoud en didactiek van de lessen (waarbij natuurlijk zowel bestaand als eigen materiaal kan worden gebruikt). Tenslotte zullen de (vak) didactische overwegingen die ten grondslag liggen aan de eigen visie onderbouwd moeten worden met behulp van relevante literatuur en eigen praktijkervaringen.

In het tweede blok van de cursus is er bij AD nadrukkelijk ruimte voordifferentiatie en de eigen leerbehoefte van de student. Er worden verschillende keuzemodules aangeboden rondom uiteenlopende algemeen didactische thema's, zoals de multiculturele school, zorg op school, omgaan met ordeproblemen en internationalisering. Studenten worden uitgenodigd om (voor een deel) zelf invulling te geven aan deze keuzeruimte.

Onderwijsvorm
Alle onderwijs vindt plaats op de instituutsdag (maandag). Studenten zijn de hele dag aanwezig. In de ochtend is er een hoor/werkcollege AD, waarbij dio's van verschillende vakken samen zitten. De colleges AD worden steeds verzorgd door een tweetal docenten. In de middag is er een werkcollege VD onder begeleiding van de vakdidacticus. Deze colleges worden samen met dio's van hetzelfde vak in verschillende samenstellingen (homogeen en heterogeen) gevolgd .

Tenslotte zijn er, verspreid over de periode, drie PG bijeenkomsten, waarbij dio's van verschillende vakken in kleine groepen en onder begeleiding de eigen onderwijspraktijk onder de loep nemen en eventuele concerns daarbij bespreken.
Bij alle onderdelen (AD, VD en PG) wordt een actieve houding van de student gevraagd, zowel tijdens de bijeenkomsten daarbuiten. Regelmatig worden er verwerkingsopdrachten gegeven, waar individueel of in groepsverband aan wordt gewerkt. Deze opdrachten worden formatief geëvalueerd, onder andere door middel van (peer)feedback.

Toetsvorm
Didactiek 3 wordt afgesloten met een geschreven meesterproef waarin de studenten demonstreren dat zij een volle lessenreeks kunnen ontwerpen en uitvoeren en kunnen reflecteren op de manier waarop voorbereiding, uitvoer en afronding hebben plaatsgevonden. De proef bestaat uit een lessenreeks met een coherente leerlijn en expliciet gemaakte inhoudelijke en didactische keuzes. Het materiaal bevat: een lessenserie met een toets, een koppeling aan en neerslag van de (pedagogische) onderwijsvisie en visie op het vak van de student en de school, docentenhandleiding, leerlingmateriaal, evaluatie met collega's en leerlingen, een videocompilatie (15 min.) van de gegeven lessen en een terugblik op ontwerp en uitvoering. Bij het ontwerpen en uitvoeren van de les maakt de student een relevante selectie uit de kernpraktijken die tijdens de opleiding centraal hebben gestaan. De terugblik op ontwerp en uitvoering vindt plaats aan de hand van de reflectiecirkel van Korthagen, de perspectieven van een docent als professional, ontwerper, uitvoerder, pedagoog en teamlid en de daarbij behorende relevante theorie. Hierbij staat de student stil bij zijn/haar ontwikkeling op het gebied van deze rollen. De proef wordt beoordeeld aan de hand van een beoordelingsmodel gerelateerd aan de rubrics die voor elk van de docentperspectieven zijn geformuleerd voor fase 3 (een startbekwame docent).

Literatuur
Bij deze cursus worden de volgende algemeen didactische handboeken gebruikt:

- Ebbens, S. & Ettekoven, S. (2012). Effectief leren – basisboek. Groningen: Noordhoff Uitgevers B.V.
- Korthagen, F. & Lagerwerf, B. (2014). Een leraar van klasse. Den Haag: Boom Lemma Uitgevers
- Teitler, P. (2013). Lessen in orde. Bussum: Coutinho.
- Kohnstamm, R. (2014). Kleine ontwikkelingspsychologie: III de puberjaren. Houten: Bohn Stafleu van Loghum.

Daarnaast wordt veelvuldig gebruik gemaakt van relevante en actuele wetenschappelijke literatuur. Deze artikelen worden tijdens de cursus ter beschikking gesteld. De literatuur die bij VD gebruikt wordt is afhankelijk van het schoolvak waarvoor wordt opgeleid.

Overige informatie
Beheersing van de inhoud van het desbetreffende schoolvak wordt als voorkennis verondersteld.
Voorwaardelijk voor afronding van Didactiek 3: een voldoende beoordeling van Didactiek 2.

Disability and Development

Vakcode	AM_470588 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. R.M.H. Peters
Examinator	dr. R.M.H. Peters
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

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

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 could not be
met without addressing the needs of people with disability has brought a new impetus to the field of disability and development. Another major 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 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 participatory methods,
• An introduction to community-based rehabilitation and disability inclusive development.

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

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

Toetsvorm
Participation in tutorial groups: 10%
Take-home examination, submitted electronically: 60%
Scientific article: 30%

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

Literatuur

See blackboard for suggested readings

Vereiste voorkennis
Bachelor-level education; any subject

Aanbevolen voorkennis
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.

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. Ruth Peters (r.m.h.peters@vu.nl)

Emergent Energy Materials

Vakcode	XMU_428571 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

Intekenprocedure
Registration is required via https://www.sis.uva.nl during the registration term before the start of the semester.

Overige informatie
This course is part of the MSc Physics and Astronomy (joint degree) and is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-science@uva.nl, +31 (0)20 525 7100.
Enrolment via https://m.sis.uva.nl/vakaanmelden is required.

Energy and Climate Change; Science, Policy and Economics

Vakcode	X_428568 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen

Niveau	400

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

Overige informatie
This course is part of the MSc Physics and Astronomy (joint degree) and is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-science@uva.nl, +31 (0)20 525 7100.
Enrolment via https://m.sis.uva.nl/vakaanmelden is required.

English Academic Course

Vakcode	XMU_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/xmlpages/page/2016-2017-en/search-course

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

Environmental Chemistry

Vakcode	XMU_437004 (437004)
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017/zoek-vak

Overige informatie
This course is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-science@uva.nl, +31 (0)20 525 7100.
Enrolment via https://m.sis.uva.nl/vakaanmelden is required.
For courses taught in period 1 and period 2, enrolment via https://datanose.nl/#specialenrol is required.

Environmental Measuring Techniques

Vakcode	AMU_0005 ()
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017/zoek-vak/vak/25324

Epidemiology

Vakcode	AM_1179 ()
Periode	Periode 3
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. R.M.H. Peters
Examinator	dr. R.M.H. Peters
Lesmethode(n)	Hoorcollege, Werkgroep, Computerpracticum
Niveau	500

Doel vak
- To be able to describe the strengths and weaknesses of traditional epidemiological study designs;
- To be able to understand, calculate, and apply measures of occurrence and association;
- To be able to understand and assess possible bias and effect modification;
- To gain an understanding of the principles of accuracy in epidemiology
- To acquire skills to interpret, describe, and present the outcomes of biostatistical analyses.
- To gain an understanding of the principles of screening and critically appraise its use in public health

Inhoud vak
The course consists of a theoretical, contextual, and practical component. The theoretical component is divided into two parts: the first part will focus on methodology (e.g. study-designs and bias), whereas the second part will emphasize applying statistical methods commonly used in epidemiology. You will primarily learn how to apply and interpret these methods in an epidemiological setting. We will focus less on the mathematical background (hence, we refer to this as ‘applied biostatistics’). The contextual component will focus on past and current epidemiological developments, for instance the start of the HIV/AIDS pandemic. Lastly, the practical component will focus on applying all your new skills.

Onderwijsvorm
• Lectures (12 hours)
• Work groups (12 hours)
• Computer practicum (8 hours)
• Self-study (remaining time)

Toetsvorm
• Exam (100%)
• Assignment (insufficient/ sufficient)
Both elements need to be sufficient.

Literatuur
Available on blackboard

Doelgroep
This course is solely intended for students without a background in epidemiology (i.e. students who attended and completed another bachelor or master course in methodology and applied biostatistics, epidemiology and biostatistics, or similar, are strongly advised not to enroll in this course).

Intekenprocedure
n/a

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

Lecturers:
Ruth Peters
Maarten Kok
Robert Borst

Fundamentals of Analytical Sciences

Vakcode	XMU_435059 (435059)
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege
Niveau	400

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

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

Green Chemistry

Vakcode	X_430557 (430557)
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen

Coördinator	dr. J.C. Slootweg
Examinator	dr. J.C. Slootweg
Lesmethode(n)	Hoorcollege
Niveau	400

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

Overige informatie
This course is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-science@uva.nl, +31 (0)20 525 7100.
Enrolment via https://m.sis.uva.nl/vakaanmelden is required.
For courses taught in period 1 and period 2, enrolment via https://datanose.nl/#specialenrol is required.

Health, Globalisation and Human Rights

Vakcode	AM_470818 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	A. van Luijn MSc
Examinator	dr. C.W.M. Dedding
Docent(en)	prof. dr. P. Heutink
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: 12 hours
Group project, simulation and exam: 11 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 the 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	XMU_428013 ()
Periode	Periode 3
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

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

High-Throughput Screening

Vakcode	X_435047 (435047)
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J. Kool
Examinator	dr. J. Kool
Docent(en)	dr. J. Kool
Lesmethode(n)	Hoorcollege
Niveau	500

Doel vak
In depth study on the High Throughput Screening (HTS), drug target, bioassay development, bio-analytical and high content screening aspects related to target and lead discovery of drugs.

Inhoud vak
During this course the potential of modern analytical and biological screening techniques used in target, hit and lead discovery will be discussed. The emphasis will be on the treatment of advanced sample preparation techniques (i.e. automation, high-throughput / combinatorial chemistry, miniaturization), biological and immunological high throughput screening assays, drug target classes, assay development, and advanced separation methods. Also, the so called "Omics" will be discussed (e.g. proteomics and metabolomics). These techniques will be discussed in relation with pharmacokinetic studies and the applicability of the various techniques within the various stages of target discovery, hit screening, ADME(tox), and early lead discovery. Finally, miniaturization approaches will be dealt with.

Onderwijsvorm
The course starts with a thorough explanation on all subjects that will be discussed, and during which lecture. During, prior to, or directly after the lectures, relevant literature per lecture will be provided. This literature is mainly from e-books (chapters) and from academic papers/reviews. All literature that has to be studied will be provided in the course documents section on BlackBoard. All literature provided on BlackBoard is part of and has to be studied for the written examination. All students will work on an assignment related to a topic in high throughput screening. This assignment results in a Word document and a PowerPoint presentation.

Toetsvorm
Examination is in the form of a written examination accounting for 50% of the final mark (depending on the number of students entering the course, optionally the written examination can be changed into an oral

examination). All lectures and all literature provided are included in the examination. All material to be studied and learned for the examination can be accessed during the examination. Students can take all printed material and/or a computer with them during the examination. De presentation followed by questions and replies to these questions constitutes 25% of the final mark. The document's topic and the presentation's topic are related to each other. The assignment document constitutes the other 25% of the final mark. The marks of the examination, the presentation and discussion afterwards, and the assignment document all have to be sufficient (mark of 5.5 or higher).If more than 12 students join this course, students will form groups of three students for the assignment document and presentation (Otherwise groups of two students will be formed).

Literatuur
Please see the Course Documents on BlackBoard. The PowerPoint presentation named "HTS Course Overview" gives a detailed explanation/overview of the lectures, tutorials and course structure. All PowerPoint lectures will be placed on BlackBoard at least one day before each lecture. All PDF e-book chapters and other literature (e.g. academic research papers and reviews) will also be provided on BlackBoard.

Aanbevolen voorkennis
Basic knowledge of biochemistry, separation sciences, spectroscopy and mass spectrometry.

Overige informatie
Basic knowledge of biochemistry, separation sciences, spectroscopy and mass spectrometry.

Homogeneous Catalysis

Vakcode	XMU_435668 (435668)
Periode	Periode 5
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege
Niveau	400

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

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

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

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

Overige informatie
This course is part of the MSc Physics and Astronomy (joint degree) and is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-science@uva.nl, +31 (0)20 525 7100.
Enrolment via https://m.sis.uva.nl/vakaanmelden is required.

Internship Biomolecular Analysis and Spectroscopy

Vakcode	XM_432523 (432523)
Periode	Ac. Jaar (september)
Credits	18.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H. Lingeman
Examinator	dr. H. Lingeman
Niveau	500

Doel vak
To acquire knowledge and insight into the role and objective of drug, bio-analytical and clinical development processes in complex samples using LC-MS and bio-assay-MS based approaches.

Inhoud vak
This project aims to provide the student with a theoretical and practical understanding of the issues involved in the design, conduct, analyses and interpretation of complex analytical studies.

Doelgroep
mCh

Overige informatie
For further information please contact Henk Lingeman.

Internship Biomolecular Analysis and Spectroscopy

Vakcode	XM_432524 (432524)
Periode	Ac. Jaar (september)
Credits	24.0

Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H. Lingeman
Examinator	dr. H. Lingeman
Niveau	500

Doel vak
To acquire knowledge and insight into the role and objective of drug, bio-analytical and clinical development processes in complex sample using LC-MS and bio-assay-MS based approaches.

Inhoud vak
This project aims to provide the student with a theoretical and pracical understanding of the issues involved in the design, conduct, analyses and interpretation of complex analytical studies.

Doelgroep
mCh

Overige informatie
For further information please contact Henk Lingeman.

Internship Biomolecular Analysis and Spectroscopy

Vakcode	XM_432525 (432525)
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H. Lingeman
Examinator	dr. H. Lingeman
Niveau	500

Doel vak
To acquire knowledge and insight into the role and objective of drug, bio-analytical and clinical development processes in complex samples using LC-MS and bio-assay-MS based approaches.

Inhoud vak
This project aims to provide the student with a theoretical and practical understanding of the issues involved in the design, conduct, analyses and interpretation of complex analytical studies.

Doelgroep
mCh

Overige informatie
For furher information please contact Henk Lingeman.

Internship Organic Chemistry

Vakcode	XM_432529 (432529)
Periode	Ac. Jaar (september)

Credits	18.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.C. Slootweg
Examinator	dr. J.C. Slootweg
Niveau	500

Doel vak
To obtain experience in doing scientific research in an industrial setting.

Inhoud vak
During a traineeship, a student actively participates in a research project within a company

Toetsvorm
presentation, report and practical work

Overige informatie
Period: varible

Internship Organic Chemistry

Vakcode	XM_432530 (432530)
Periode	Ac. Jaar (september)
Credits	24.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.C. Slootweg
Examinator	dr. J.C. Slootweg
Niveau	500

Doel vak
To obtain experience in doing scientific research in an industrial setting.

Inhoud vak
during a traineeship, a student actively participates in a research project within a company

Toetsvorm
presentation, report and practical work

Overige informatie
Period: variable

Internship Organic Chemistry

Vakcode	XM_432531 (432531)
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels

Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.C. Slootweg
Examinator	dr. J.C. Slootweg
Niveau	500

Doel vak
during a traineeship, a student actively participates in a research project within a company

Inhoud vak
during a traineeship, a student actively participates in a research project within a company

Toetsvorm
presentation, report and practical work

Overige informatie
Period: variable

Internship Societal Specialisation

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

Internship Theoretical Chemistry

Vakcode	XM_432532 (432532)
Periode	Ac. Jaar (september)
Credits	18.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. C. Fonseca Guerra
Examinator	dr. C. Fonseca Guerra
Niveau	500

Doel vak
To obtain experience in theoretical and computational chemistry techniques and doing scientific research.

Toetsvorm
presentation, report, practical work

Doelgroep

MSP and MDSC track

Overige informatie
Period: variable

Internship Theoretical Chemistry

Vakcode	XM_432533 (432533)
Periode	Ac. Jaar (september)
Credits	24.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. C. Fonseca Guerra
Examinator	dr. C. Fonseca Guerra
Niveau	500

Doel vak
To obtain experience in theoretical chemistry and computational techniques and doing scientific research.

Toetsvorm
presentation, report and practical work

Overige informatie
Period: variable

Internship Theoretical Chemistry

Vakcode	XM_432534 (432534)
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. C. Fonseca Guerra
Examinator	dr. C. Fonseca Guerra
Niveau	500

Doel vak
To obtain experience in theoretical and computational chemistry techniques and doing scientific research.

Toetsvorm
presentation, report, practical work

Overige informatie
Period: variable
Contact coordinator: C.FonsecaGuerra@vu.nl

Literature Thesis and Colloquium Chemistry - Organic Chemistry

Vakcode	XM_432583 (432583)

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

Inhoud vak
the student can choose from a wide variety of topics in main group chemistry, organometallic chemistry and catalysis

Toetsvorm
report and presentation

Doelgroep
mCH-MDSC

Literature Thesis and Colloquium Chemistry - Physical Chemistry

Vakcode	XM_432582 (432582)
Periode	Ac. Jaar (september)
Credits	12.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. C. Fonseca Guerra
Examinator	dr. C. Fonseca Guerra
Niveau	600

Literature Thesis and Colloquium Chemistry - Theoretical Chemistry

Vakcode	XM_432584 (432584)
Periode	Ac. Jaar (september)
Credits	12.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. C. Fonseca Guerra
Examinator	dr. C. Fonseca Guerra
Niveau	600

Literature thesis and Colloquium Chemistry Molecular Simulation and Photonics

Vakcode	XM_432679 (432679)
Periode	Ac. Jaar (september)
Credits	12.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen

Coördinator	dr. C. Fonseca Guerra
Examinator	dr. C. Fonseca Guerra
Niveau	600

Literature Thesis SES

Vakcode	XM_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

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

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

Overige informatie
This course is offered at the UvA. For more information contact: FNWI
Education Service Centre, Science Park 904,
servicedesk-esc-science@uva.nl, +31 (0)20 525 7100.
Enrolment via https://m.sis.uva.nl/vakaanmelden is required.
For courses taught in period 1 and period 2, enrolment via
https://datanose.nl/#specialenrol is required.

Mass Spectrometry

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

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017/zoek-vak

Overige informatie
This course is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-science@uva.nl, +31 (0)20 525 7100.
Enrolment via https://m.sis.uva.nl/vakaanmelden is required.
For courses taught in period 1 and period 2, enrolment via https://datanose.nl/#specialenrol is required.

Master Project SfES

Vakcode	XM_422593 ()
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	600

Master Project SfES

Vakcode	XM_422594 ()
Periode	Ac. Jaar (september)
Credits	36.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. J.T.M. Kennis
Examinator	prof. dr. J.T.M. Kennis
Niveau	600

Master Project SfES

Vakcode	XM_422595 ()
Periode	Ac. Jaar (september)
Credits	42.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. J.T.M. Kennis
Examinator	prof. dr. J.T.M. Kennis
Niveau	600

Master Project SfES

Vakcode	XM_422596 ()
Periode	Ac. Jaar (september)

Credits	48.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. J.T.M. Kennis
Examinator	prof. dr. J.T.M. Kennis
Niveau	600

Master Project SfES

Vakcode	XM_422597 ()
Periode	Ac. Jaar (september)
Credits	54.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. J.T.M. Kennis
Examinator	prof. dr. J.T.M. Kennis
Niveau	600

Master Research Project Biomol. Analysis and Spectr.

Vakcode	XM_432594 (432594)
Periode	Ac. Jaar (september)
Credits	42.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H. Lingeman
Examinator	dr. H. Lingeman
Niveau	600

Doel vak
To acquire knowledge and insight into the role and objective of drug, bio-analytical and clinical development processes in complex sample using LC-MS and bio-assay_MS based approaches.

Inhoud vak
This project aims to provide the student with a theoretical and practical understanding of the issues involved in the design, conduct, analyses and interpretation of complex analytical studies.

Doelgroep
mCh

Overige informatie
For further information please contact Henk Lingeman.

Master Research Project Biomol. Analysis and Spectr. ext

Vakcode	XM_432595 (432595)

Periode	Ac. Jaar (september)
Credits	18.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H. Lingeman
Examinator	dr. H. Lingeman
Niveau	600

Doel vak
To acquire knowledge and insight into the role and objective of drug, bio-analytical and clinical development processes in complex samples using LC-MS and bio-assay-MS based approaches.

Inhoud vak
This project aims to provide the student with a theoretical and practical understanding of the issues involved in the design, conduct, analyses and interpretation of complex analytical studies.

Doelgroep
mCh.

Overige informatie
For further information please contact Henk Lingeman.

Master Research Project Biomol. Analysis and Spectr. ext

Vakcode	XM_432637 (432637)
Periode	Ac. Jaar (september)
Credits	12.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H. Lingeman
Examinator	dr. H. Lingeman
Niveau	600

Doel vak
To acquire knowledge and insight into the role and objective of drug, bioanalytical and clinical development processes in complex sample using LC-MS and bio-assay-MS based approaches.

Inhoud vak
This project aims to provide the student with a theoretical and practical understanding of the issues involved in the design, conduct, analyses and interpretation of complex analytical studies.

Doelgroep
mCh.

Overige informatie
For further information please contact Henk Lingeman.

Master Research Project Biomol. Analysis and Spectr. ext

Vakcode	XM_432680 (432680)
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H. Lingeman
Examinator	dr. H. Lingeman
Niveau	600

Doel vak
To acquire knowledge and insight into the role and objective of drug, bio-analytical and clinical development processes in complex samples using LC-MS and bio-assay-MS base approaches.

Inhoud vak
This project aims to provide the student with a theoretical and practical understanding of the issues involved in the design, conduct, analyses and interpretation of complex analytical studies.

Doelgroep
mCh

Overige informatie
For further information please contact Henk Lingeman.

Master Research Project Chemistry - Organic Chemistry

Vakcode	XM_432598 (432598)
Periode	Ac. Jaar (september)
Credits	42.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.C. Slootweg
Examinator	dr. J.C. Slootweg
Niveau	600

Doel vak
To obtain experience in organic chemistry techniques and doing scientific research.

Inhoud vak
the student can choose from a wide variety of research projects in main group chemistry, organometallic chemistry and catalysis

Toetsvorm
presentation, report, practical work

Doelgroep
mCH-MDSC

Master Research Project Chemistry - Organic Chemistry - Extension

Vakcode	XM_432618 (432618)
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

Master Research Project Chemistry - Organic Chemistry - Extension

Vakcode	XM_432599 (432599)
Periode	Ac. Jaar (september)
Credits	18.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.C. Slootweg
Examinator	dr. J.C. Slootweg
Niveau	600

Doel vak
To obtain experience in organic chemistry techniques and doing scientific research.

Inhoud vak
the student can choose from a wide variety of research projects in main group chemistry, organometallic chemistry and catalysis

Toetsvorm
presentation, report and practical work

Doelgroep
mCH-MDSC

Master Research Project Chemistry - Organic Chemistry - Extension

Vakcode	XM_432685 (432685)
Periode	Ac. Jaar (september)
Credits	12.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.C. Slootweg
Examinator	dr. J.C. Slootweg
Niveau	600

Master Research Project Chemistry Molecular Simulation and Photonics - Extension

Vakcode	XM_432684 (432684)

Periode	Ac. Jaar (september)
Credits	18.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. C. Fonseca Guerra
Examinator	dr. C. Fonseca Guerra
Niveau	600

Master Research Project Communication Variant

Vakcode	XM_432586 (432586)
Periode	Ac. Jaar (september)
Credits	36.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. ir. R.V.A. Orru
Examinator	prof. dr. ir. R.V.A. Orru
Niveau	600

Doel vak
please contact the mastercoordinator of your track

Master Research Project Education Variant

Vakcode	XM_432587 (432587)
Periode	Ac. Jaar (september)
Credits	36.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. ir. R.V.A. Orru
Examinator	prof. dr. ir. R.V.A. Orru
Niveau	600

Doel vak
please contact the mastercoordinator of your track

Master Research Project Molecular Simulation and Photonics

Vakcode	XM_432681 (432681)
Periode	Ac. Jaar (september)
Credits	42.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. C. Fonseca Guerra
Examinator	dr. C. Fonseca Guerra
Niveau	600

Doel vak
To obtain experience in theoretical and computational chemistry techniques and doing scientific research.

Overige informatie
Period: variable
Contact coordinator: C.FonsecaGuerra@vu.nl

Master Research Project Molecular Simulation and Photonics - ext

Vakcode	XM_432682 (432682)
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. C. Fonseca Guerra
Examinator	dr. C. Fonseca Guerra
Niveau	600

Doel vak
To obtain experience in theoretical and computational chemistry techniques and doing scientific research.

Overige informatie
Period: variable
Contact coordinator: C.FonsecaGuerra@vu.nl

Master Research Project Molecular Simulation and Photonics - ext

Vakcode	XM_432683 (432683)
Periode	Ac. Jaar (september)
Credits	12.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. C. Fonseca Guerra
Examinator	dr. C. Fonseca Guerra
Niveau	600

Doel vak
To obtain experience in theoretical and computational chemistry techniques and doing scientific research.

Overige informatie
Period: variable
Contact coordinator: C.FonsecaGuerra@vu.nl

Master Research Project Society Oriented Variant

Vakcode	XM_432588 (432588)
Periode	Ac. Jaar (september)

Credits	36.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. ir. R.V.A. Orru
Examinator	prof. dr. ir. R.V.A. Orru
Niveau	600

Doel vak
please contact the mastercoordinator of your track

Materials for energy and environmental sustainability

Vakcode	X_432850 ()
Periode	Periode 4+5
Credits	12.0
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	500

Inhoud vak
This course will help you understand critical relationships between the environment, energy and sustainability. The course will provide comprehensive coverage of each topic, bringing together diverse subject matter by integrating theory with engaging insights. It includes helpful features to aid understanding, including a historical overview and suggested questions for discussion.

Literatuur
Book 'Fundamentals of Materials for Energy and Environmental Sustainability' by D.S. Ginley and D. Cahen (MRS, Cambridgre University Press)

Doelgroep
Master SBI, track Life & Health and Energy & Sustainability

Medical Imaging

Vakcode	XMU_428526 (428526)
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

http://studiegids.uva.nl/xmlpages/page/2015-2016/zoek-vak/vak/14926

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

Minor Research Project Biomol. Analysis and Spectr.

Vakcode	XM_432649 (432649)
Periode	Ac. Jaar (september)
Credits	18.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H. Lingeman
Examinator	dr. H. Lingeman
Niveau	500

Doel vak
To acquire knowledge and insight into the role and objective of drug, bio-analytical and clinical development processes in complex samples using LC-MS and bio-assay-MS based approaches.

Inhoud vak
This project aims to provide the student with a theoretical and practical understanding of the issues involved in the design, conduct, analyses and interpretation of complex analytical studies.

Doelgroep
mCh

Overige informatie
For further information please contact Henk Lingeman.

Minor Research Project Biomol. Analysis and Spectr.

Vakcode	XM_432650 (432650)
Periode	Ac. Jaar (september)
Credits	24.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H. Lingeman
Examinator	dr. H. Lingeman
Niveau	500

Doel vak
To acquire knowledge and insight into the role and objective of drug, bio-analytical and clinical development processes in complex samples using LC-MS and bio-assay-MS based approaches.

Inhoud vak
This project aims to provide the student with a theoretical and practical understanding of the issues involved in the design, conduct, analyses and interpretation of complex analytical studies.

Doelgroep
mCh

Overige informatie
For further information please contact Henk Lingeman.

Minor Research Project Biomol. Analysis and Spectr.

Vakcode	XM_432651 (432651)
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H. Lingeman
Examinator	dr. H. Lingeman
Niveau	500

Doel vak
To acquire knowledge and insight into the role and objective of drug, bio-analytical and clinical development processes in complex samples using LC-MS and bio-assay-MS based approaches.

Inhoud vak
This project aims to provide the student with a theoretical and practical understanding of the issues involved in the design, conduct, analyses and interpretaion of complex analyical studies.

Doelgroep
mCh

Overige informatie
For further information please contact Henk Lingeman.

Minor Research Project Organic Chemistry

Vakcode	XM_432640 (432640)
Periode	Ac. Jaar (september)
Credits	18.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.C. Slootweg
Examinator	dr. J.C. Slootweg
Niveau	500

Doel vak
To obtain experience in organic chemistry techniques and doing scientific research.

Inhoud vak
the student can choose from a wide variety of research projects in main group chemistry, organometallic chemistry and catalysis

Toetsvorm
presentation, report and practical work

Minor Research Project Organic Chemistry

Vakcode	XM_432641 (432641)
Periode	Ac. Jaar (september)
Credits	24.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.C. Slootweg
Examinator	dr. J.C. Slootweg
Niveau	500

Doel vak
To obtain experience in organic chemistry techniques and doing scientific research.

Inhoud vak
the student can choose from a wide variety of research projects in main group chemistry, organometallic chemistry and catalysis

Toetsvorm
presentation, report and practical work

Minor Research Project Organic Chemistry

Vakcode	XM_432642 (432642)
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.C. Slootweg
Examinator	dr. J.C. Slootweg
Niveau	500

Doel vak
To obtain experience in organic chemistry techniques and doing scientific research.

Minor Research Project Theoretical Chemistry

Vakcode	XM_432646 (432646)
Periode	Ac. Jaar (september)
Credits	18.0
Voertaal	Engels

Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. C. Fonseca Guerra
Examinator	dr. C. Fonseca Guerra
Niveau	500

Doel vak
To obtain experience in theoretical and computational chemistry techniques and doing scientific research.

Aanbevolen voorkennis
Computational Chemistry

Doelgroep
Master Chemistry and DDS

Overige informatie
Period: variable

Minor Research Project Theoretical Chemistry

Vakcode	XM_432647 (432647)
Periode	Ac. Jaar (september)
Credits	24.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. C. Fonseca Guerra
Examinator	dr. C. Fonseca Guerra
Niveau	500

Doel vak
To obtain experience in theoretical and computational chemistry techniques and doing scientific research.

Aanbevolen voorkennis
Computational Chemistry

Doelgroep
mCH and mDDS

Overige informatie
Period: variable

Minor Research Project Theoretical Chemistry

Vakcode	XM_432648 (432648)
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. C. Fonseca Guerra
Examinator	dr. C. Fonseca Guerra

Niveau	500

Doel vak
To obtain experience in theoretical and computational chemistry techniques and doing scientific research.

Aanbevolen voorkennis
Computational Chemistry

Doelgroep
mCH: MSP and MDSC track

Overige informatie
Period: variable

Molecular Computational Chemistry

Vakcode	X_435666 (435666)
Periode	Periode 5
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. F.M. Bickelhaupt
Examinator	prof. dr. F.M. Bickelhaupt
Docent(en)	prof. dr. F.M. Bickelhaupt, dr. C. Fonseca Guerra
Lesmethode(n)	Hoorcollege, Practicum
Niveau	400

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

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

Molecular Photodynamics

Vakcode	XM_432701 (432701)
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	500

Doel vak
The objective of this course is to make students familiar with detailed chemical dynamics in chemical processes. In particular the importance of photochemical bondbreaking and atmospheric (troposhere and stratosphere) photochemistry will be presented. The role of fundamental physical forces that determine the dynamics and energetics of chemical bondbreaking will be discussed. The students will learn about the latest

state-of-the-art experimental technology to follow a chemical reaction in real time. In particular lasers and their phenomenal potential in chemical research will be discussed.

Inhoud vak
We will discuss the role of forces and the Born-Oppenheimer potential in chemical bondbreaking. Photochemistry, energetics and angular properties of molecules and chemical reactions will be presented. Photons, light, lasers and their potential for the study of chemical reactions and applications in various areas of chemistry will be discussed. Laser spectroscopy, atmospheric chemistry, global warming and the role of greenhouse gasses will be discussed. State-of-the-art developments in physical chemistry like the mass-spectrometric detection of chiral molecules by femtosecond laser technology and three-dimensional particle imaging will be presented.

Toetsvorm
To be determined in consultation with the student.

Literatuur
To be determined in consultation with the lecturer.

Doelgroep
Students interested in state-of-the-art developments in physical chemistry and laser spectroscopy.

Overige informatie
Period: in consultation with the lecturer.

Networked Organizations and Communication

Vakcode	S_NOC ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Sociale Wetenschappen
Coördinator	dr. A. Nerghes
Examinator	dr. A. Nerghes
Docent(en)	dr. A. Nerghes
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	600

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 about the developing field of networked organizations and communication. Moreover, they can carry out a small-scale research project (in groups) using a network software tool to conduct social and semantic network analysis, and reflect on the results.

Inhoud vak
The seminar Networked Organizations and Communication aims at gaining in-depth insight into networked organizations 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.

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

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.

Intekenprocedure
In this course you can not enroll yourself for the tutorials, but you will be assigned by the course coordinator. You will find to which tutorial you are assigned in your personal schedule in VUnet.
Note: You do have to register for the course, with the remaining corresponding parts!

Nuclear Magnetic Resonance

Vakcode	XMU_435667 (435667)
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege
Niveau	500

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

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

Numerical Techniques

Vakcode	XMU_420082 (420082)
Periode	Periode 4+5
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege

Niveau	400

Inhoud vak
The course description is available on
http://studiegids.uva.nl/web/uva/sgs/nl/c/220.html

Doelgroep
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

Open Innovation in Science and Sustainability

Vakcode	X_422598 ()
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)	drs. P. van Hoorn
Lesmethode(n)	Hoorcollege
Niveau	400

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

Overige informatie
This course is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-science@uva.nl, +31 (0)20 525 7100.
Enrolment via https://m.sis.uva.nl/vakaanmelden is required.
For courses taught in period 1 and period 2, enrolment via https://datanose.nl/#specialenrol is required.

Organic Photovoltaics

Vakcode	X_422590 ()
Periode	Periode 5
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
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

Overige informatie
This course is part of the MSc Physics and Astronomy (joint degree) and is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-science@uva.nl, +31 (0)20 525 7100.
Enrolment via https://m.sis.uva.nl/vakaanmelden is required.

Peergroup fase 1

Vakcode	O_MLPEERGR_1 ()
Periode	Periode 1+2+3
Credits	0.0
Voertaal	Nederlands
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	drs. I. Pauw
Examinator	dr. A. Handelzalts
Lesmethode(n)	Werkgroep
Niveau	400

Doel vak
In de peergroup staat de rol als ‘professional’ centraal. Studenten leren de regie te nemen over hun eigen leerproces en hun visie op onderwijs te beschrijven. Ze ontwikkelen een professionele identiteit, waarin ze de eisen die het beroep van docent aan ze stelt verbinden met eigen waarden en motieven. In peergroups reflecteren studenten op hun handelen in de praktijk, leiden daaruit ontwikkelpunten af, formuleren acties en evalueren deze. Verschillende instrumenten en methodes worden gebruikt (logboek, reflectiecirkel, intervisie, videoreflectie, etc.) om de student in staat te stellen de complexiteit van de onderwijspraktijk te doorgronden en hiervan te leren.

Peergroup Fase 2

Vakcode	O_MLPEERGR_2 ()
Periode	Periode 3+4+5
Credits	0.0
Voertaal	Nederlands
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	dr. A. Handelzalts
Examinator	dr. A. Handelzalts
Lesmethode(n)	Werkgroep

Doel vak
In de peergroup staat de rol als ‘professional’ centraal. Studenten leren de regie te nemen over hun eigen leerproces en hun visie op onderwijs te beschrijven. Ze ontwikkelen een professionele identiteit, waarin ze de eisen die het beroep van docent aan ze stelt verbinden met

eigen waarden en motieven. In peergroups reflecteren studenten op hun handelen in de praktijk, leiden daaruit ontwikkelpunten af, formuleren acties en evalueren deze. Verschillende instrumenten en methodes worden gebruikt (logboek, reflectiecirkel, intervisie, videoreflectie, etc.) om de student in staat te stellen de complexiteit van de onderwijspraktijk te doorgronden en hiervan te leren.

Photosynthesis and Energy

Vakcode	X_422553 (422553)
Periode	Periode 5
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
Lesmethode(n)	Hoorcollege
Niveau	500

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

Overige informatie
This course is part of the MSc Physics and Astronomy (joint degree) and is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-science@uva.nl, +31 (0)20 525 7100.
Enrolment via https://m.sis.uva.nl/vakaanmelden is required.

Photovoltaics

Vakcode	XMU_428516 (428516)
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

Overige informatie
This course is part of the MSc Physics and Astronomy (joint degree) and is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-science@uva.nl, +31 (0)20 525 7100.
Enrolment via https://m.sis.uva.nl/vakaanmelden is required.

Policy, Politics and Participation

Vakcode	AM_470589 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	P. Klaassen MA
Examinator	P. Klaassen MA
Docent(en)	dr. J.F.H. Kupper, P. Klaassen MA, prof. dr. J.E.W. Broerse
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Doel vak
1) To deepen your analytic skills with respect to the assessment of a specific societal problem;
2) To acquire further insight into the practice of interactive research;
3) To acquire further insights into specific methods and techniques of interactive research;
4) To practice skills in data collection and analysis;
5) To improve your argumentation skills;
6) To improve your communication skills;
7) To improve your skills in working effectively in a project team;
8) To deepen your knowledge of political theory and policy-making.

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

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

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 1

Vakcode	O_MLPRAK_1 ()
Periode	Periode 1
Credits	6.0
Voertaal	Nederlands
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	drs. Y.G. Meindersma
Examinator	drs. Y.G. Meindersma
Docent(en)	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, drs. I. Pauw, drs. C.D.P. van Oeveren, drs. S. Donszelmann, dr. H.B. Westbroek, C.L. Geraedts, dr. A.A. Kaal, dr. A. Handelzalts, drs. K.L. Schaap, drs. A.J.C. Monquil, dr. J.G.M. van der Aalsvoort, drs. J.B. Penninx, W. Maas, F.L. de Vries MSc, drs. H. Stouthart, drs. E.D. van Noort, drs. N.H. Ypenburg, drs. J. Quartel
Lesmethode(n)	Werkgroep
Niveau	400

Inhoud vak
Op de school wordt de aandacht op dezelfde kernpraktijken gericht als gedurende de instituutsopleiding. De werkplekbegeleider is op de hoogte van de onderwerpen die op de instituutdag gebruikt worden en gebruikt dezelfde rubric als de instituutsopleiders en vakdidactici om de vorderingen van de studenten te beoordelen.

Onderwijsvorm
Onder begeleiding van de werkplekbegeleider nemen de studenten steeds een groter en actiever aandeel in het lesgeven en werken in de school. Studenten met een baan (zij-instromers, onderwijstrainees etc) geven in dit stadium al zelfstandig les. Bij deze studenten is de nadruk bij de begeleiding vanuit de werkplekbegeleider op het niveau van didactische

handelen in de les.

Toetsvorm
Op de school geven de studenten een presentatie over hun prestaties in de eerste acht weken. Dat doen ze aan de hand van de relevante rollen (vier van de vijf waarbij uitvoerder, ontwerper en pedagoog de meeste aandacht krijgen bij de reflectie op het lesgeven). De werkplekbegeleider gebruikt de rubric om het functioneren van de studenten in de klas te evalueren.

Praktijk 2

Vakcode	O_MLPRAK_2 ()
Periode	Periode 2+3
Credits	9.0
Voertaal	Nederlands
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	dr. A. Handelzalts
Examinator	drs. Y.G. Meindersma
Docent(en)	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, ir. E.J.F. Scheringa, drs. C.D.P. van Oeveren, drs. S. Donszelmann, dr. H.B. Westbroek, C.L. Geraedts, dr. A.A. Kaal, dr. A. Handelzalts, drs. K.L. Schaap, drs. J.B. Penninx, W. Maas, F.L. de Vries MSc, drs. H. Stouthart, drs. J. Quartel
Lesmethode(n)	Werkgroep
Niveau	400

Inhoud vak
Tijdens de praktijkstage werken studenten aan het verder ontwikkelen van de kernpraktijken die in het instituutsdeel aan de orde zijn gekomen. Net als in fase 1 komt de verbinding tussen theorie en praktijk aan de orde. Op de werkplek wordt de aandacht op dezelfde vaardigheden gericht als tijdens de instituutsopleiding. Dit betekent dat studenten, samen met hun werkplekbegeleider, gericht werken aan de verschillende thema's besproken in de (vak)didactiekcolleges van Didactiek 1 en 2.

Onderwijsvorm
Onder begeleiding van de werkplekbegeleider nemen de studenten steeds een groter en actiever aandeel in het lesgeven en werken in de school.

Toetsvorm
De praktijkbeoordeling wordt uitgevoerd door de vakdidacticus/instituutsopleider en de werkplekbegeleider aan de hand van het eerste lesbezoek en de ingevulde rubric.

Overige informatie
Voorwaardelijk voor afronding van Praktijk 2: een voldoende beoordeling van Praktijk 1 en Didactiek 1.

Praktijk 3

Vakcode	O_MLPRAK_3 ()
Periode	Periode 1+2+3, Periode 4+5+6

Credits	15.0
Voertaal	Nederlands
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	drs. Y.G. Meindersma
Examinator	drs. Y.G. Meindersma
Docent(en)	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, drs. I. Pauw, drs. C.D.P. van Oeveren, drs. S. Donszelmann, dr. H.B. Westbroek, C.L. Geraedts, dr. A.A. Kaal, dr. A. Handelzalts, drs. K.L. Schaap, drs. A.J.C. Monquil, dr. J.G.M. van der Aalsvoort, drs. J.B. Penninx, W. Maas, F.L. de Vries MSc, drs. H. Stouthart, drs. E.D. van Noort, drs. N.H. Ypenburg, drs. J. Quartel
Niveau	400

Inhoud vak
In het verdiepingsdeel gaat de student meer en meer zelf(standig) lesgeven. De voorbereiding en evaluatie wordt samen met de werkplekbegeleider gedaan. Op de werkplek komen dezelfde onderwerpen aan de orde als in het instituut: vakdidactische verdieping van onderwijsconcepten en –strategieën, aandacht voor het afstemmen van onderwijs op de behoeften van individuele leerlingen, diversiteit en excellentie.

Op de werkplek wordt de aandacht op dezelfde vaardigheden gericht als tijdens de instituutsopleiding. Dit betekent dat studenten, samen met hun werkplekbegeleider, gericht werken aan de verschillende thema's besproken in de vakdidactiekdidactiek en de keuze modules. Het instituut biedt hiervoor concrete handreikingen aan in de vorm van een stageplan (gekoppeld aan de rubric).

Onderwijsvorm
Onder begeleiding van de werkplekbegeleider nemen de studenten steeds een groter en actiever aandeel in het lesgeven en werken in de school.

Toetsvorm
Voor de beoordeling van Praktijk 3 maakt de student in blok 6 een afspraak met zijn WPB en SO voor een afrondend lesbezoek. In overleg met de WPB en SO bepaalt de student welke klas hiervoor het meest geschikt is.
Na afloop van het lesbezoek blikken WPB en SO met de student terug op de les. WPB en SO beoordelen de les aan de hand van de checklist (rubric). Gecombineerd met het oordeel van vakdidacticus aan de hand van de tweede lesbezoek wordt een cijfer vastgesteld.

Overige informatie
Voorwaarden voor afronding van Praktijk 3: een voldoende beoordeling van Praktijk 2 en Didactiek 2.

Praktijk I

Vakcode	O_MLPRAKI ()
Periode	Ac. Jaar (september)
Credits	15.0
Voertaal	Nederlands

Faculteit	Fac. der Gedrags- en Bewegingswetensch.
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 lesuren in de bovenbouw havo/vwo.
De verdeling en fasering van dit aantal uren over Praktijk 1 en 2 wordt in overleg met de begeleider op school bepaald. In Praktijk 1 ligt de nadruk op het observeren en het onder begeleiding voorbereiden, uitvoeren en evalueren van lessen.

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

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

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

Praktijk II

Vakcode	O_MLPRAKII ()
Periode	Ac. Jaar (september)
Credits	15.0
Voertaal	Nederlands
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
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.

Praktijkonderzoek 1

Vakcode	O_MLPROZ_1 ()
Periode	Periode 3
Credits	3.0
Voertaal	Nederlands
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	dr. H.B. Westbroek
Examinator	dr. H.B. Westbroek

Docent(en)	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, ir. E.J.F. Scheringa, prof. dr. M. Meeter, drs. I. Pauw, drs. C.D.P. van Oeveren, drs. S. Donszelmann, drs. B. Klein, drs. W. Jongejan, drs. L.J. van Well-van Grootheest, dr. T. Bosma, dr. H.B. Westbroek, C.L. Geraedts, dr. J.M.H. Swennen, dr. A.A. Kaal, dr. A. Handelzalts, drs. K.L. Schaap, dr. B. de Vries, drs. A.J.C. Monquil, dr. J.G.M. van der Aalsvoort, drs. J.B. Penninx, W. Maas, F.L. de Vries MSc, drs. H. Stouthart, drs. E.D. van Noort, drs. N.H. Ypenburg, drs. J. Quartel
Lesmethode(n)	Werkgroep, Hoorcollege
Niveau	400

Doel vak
Tijdens het praktijkonderzoek vullen studenten de tijdens hun master opgedane onderzoeksvaardigheden aan met onderzoeksvaardigheden voor de eigen onderwijspraktijk.

Inhoud vak
In praktijkonderzoek 1 richt de opdracht zich primair op het leren herkennen, waarderen en gebruiken van verschillen type bronnen (praktijkbronnen, vakliteratuur en wetenschappelijke literatuur) om praktijkproblemen te analyseren en te duiden. Studenten verdiepen zich samen met hun collega's en begeleiders op school op een probleem uit de praktijk. Ze krijgen handvatten aangereikt om bronnen te zoeken en te beoordelen op relevantie en bruikbaarheid. Studenten werken op grond hiervan de praktische en theoretische context van het probleem uit.

Onderwijsvorm
De begeleiding vindt plaats op school (academische opleidingsschool) en op het instituut en bestaat uit de volgende vormen: colleges, werkcolleges, duo-begeleiding (VO docent/ULO docent).

Toetsvorm
Praktijkonderzoek 1 wordt afgesloten met een uitgewerkt praktijkprobleem. Onderzoeksvragen worden geformuleerd op basis van een probleemanalyse, en een verkenning van de praktische en theoretische context van het praktijkprobleem.

Literatuur
- Van der Donk, C., & Van Lanen, B. (2012). Praktijkonderzoek in de school. 2de druk. Coutinho, Bussum. ISBN 9789046903001
- Relevante en actuele artikelen over het onderzoeksonderwerp (via blackboard en zelf verzamelen).

Overige informatie
Binnen Didactiek 1 en 2 hebben de studenten kennisgemaakt met het toepassen van relevante bronnen, waaronder onderzoeksartikelen, om praktijksituaties te duiden.

Praktijkonderzoek 2

Vakcode	O_MLPROZ_2 ()
Periode	Periode 1+2+3, Periode 4+5+6
Credits	6.0
Voertaal	Nederlands

Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	dr. H.B. Westbroek
Examinator	dr. H.B. Westbroek
Docent(en)	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, ir. E.J.F. Scheringa, prof. dr. M. Meeter, drs. I. Pauw, drs. C.D.P. van Oeveren, drs. S. Donszelmann, drs. B. Klein, drs. W. Jongejan, drs. L.J. van Well-van Grootheest, dr. T. Bosma, dr. H.B. Westbroek, C.L. Geraedts, dr. J.M.H. Swennen, dr. A.A. Kaal, dr. A. Handelzalts, drs. K.L. Schaap, dr. B. de Vries, drs. A.J.C. Monquil, dr. J.G.M. van der Aalsvoort, drs. J.B. Penninx, W. Maas, F.L. de Vries MSc, drs. H. Stouthart, drs. E.D. van Noort, drs. N.H. Ypenburg, drs. J. Quartel
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	400

Doel vak
Tijdens het praktijkonderzoek vullen studenten de tijdens hun master opgedane onderzoeksvaardigheden aan met onderzoeksvaardigheden voor de eigen onderwijspraktijk.

Inhoud vak
In Praktijkonderzoek 2 worden onderzoeksvragen uit de onderwijspraktijk vertaald in empirisch onderzoek. De student analyseert data uit de onderwijspraktijk om een antwoord te vinden op de onderzoeksvraag en rapporteert de bevindingen in een onderzoeksverslag en een presentatie aan de collega’s in de school en aan mede-studenten op het instituut. Er wordt met name aandacht besteed aan de aard en doelen van praktijkonderzoek, en consequenties die dit heeft voor kwaliteitseisen en de betekenis van praktijkonderzoek voor de beroepspraktijk.

Onderwijsvorm
De begeleiding vindt plaats op school (academische opleidingsschool) en op het instituut en bestaat uit de volgende vormen: colleges, werkcolleges, duo-begeleiding (VO docent/ULO docent).

Toetsvorm
Praktijkonderzoek 2 wordt afgesloten met een verslag en een posterpresentatie over hun bevindingen en ze delen hun bevindingen zowel op het instituut als op school.

Literatuur
- Van der Donk, C., & Van Lanen, B. (2012). Praktijkonderzoek in de school. 2de druk. Coutinho, Bussum. ISBN 9789046903001
- Relevante en actuele artikelen over het onderzoeksonderwerp (via blackboard en zelf verzamelen).

Vereiste voorkennis
Vereiste voorkennis: Praktijkonderzoek 1 en onderzoekservaring op masterniveau in het eigen domeinvak.

Principles of Pharmaceutical Sciences / Pharmacochemistry

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 Pharmaceutical sciences 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	Ac. Jaar (september)
Credits	3.0
Voertaal	Nederlands
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	dr. A. Handelzalts
Examinator	dr. A. Handelzalts

Docent(en)	drs. J.K.W. Riksen, drs. H.R. Goudsmit, drs. Y.G. Meindersma, drs. I. Pauw, drs. C.D.P. van Oeveren, drs. S. Donszelmann, drs. W. Jongejan, dr. H.B. Westbroek, C.L. Geraedts, prof. dr. J.J. Beishuizen, dr. A.A. Kaal, drs. K.L. Schaap, W. Maas, 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
Overgangsegeling met ingang van 31 augustus 2015:

Studenten die in september 2015 nog niet klaar zijn met het volgen van onderwijs van de eerste fase van het oude curriculum moeten voor het concrete onderwijs aanschuiven bij (een deel van) de colleges van het nieuwe curriculum. Dit wordt per geval besproken met de mentor.

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

Protein Analysis

Vakcode	X_435045 (435045)
Periode	Periode 5
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H. Lingeman
Examinator	dr. H. Lingeman
Docent(en)	dr. H. Lingeman
Lesmethode(n)	Hoorcollege
Niveau	500

Doel vak
Providing a clear overview on the principles and techniques that can be used for the qualitative and quantitative determination of protein-type of compounds.

Inhoud vak
The qualitative and quantitative determination of protein frequently is performed by a combination of chromatographic /electrophoretic and mass spectrometric techniques. The principles of these techniques will be discussed as well as their applications. Special attention will be given to sample treatment procedures and affinity-based separation techniques. With respect to the identification of unknown biological macromolecules, the power of hyphenated techniques in combination with the various modes of mass spectrometry will be highlighted.

Onderwijsvorm
Lectures and tutorials

Toetsvorm
Oral examination.

Literatuur
Hand-outs (electronically available).

Vereiste voorkennis
Basic knowledge of biochemistry, separation sciences, spectroscopy and mass spectrometry.

Doelgroep
mCh-AS, mCh-MDSC, mDDS-BCCA, mDDS-DDTF

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, dr. J.N.M. Commandeur, dr. D. Bald, dr. ir. K.A. Feenstra, prof. dr. M.J. Smit, dr. D.P. Geerke, prof. dr. ir. E.J.G. Peterman
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 proprties of amino acid residues.
3. can predict the function of (parts of) a protein based on undestanding 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 (100%)

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

Quantum Theory of Molecules and Matter

Vakcode	XMU_428517 (428517)
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

Overige informatie
This course is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904,
servicedesk-esc-science@uva.nl, +31 (0)20 525 7100.
Enrolment via https://m.sis.uva.nl/vakaanmelden is required.
For courses taught in period 1 and period 2, enrolment via https://datanose.nl/#specialenrol is required.

Reflective Practice Internship Science Communication

Vakcode	AM_1163 ()

Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	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). One of the two possible formats is the Reflective Practice Internship (RPI). 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-based placement

Toetsvorm
Written report and oral presentation.
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 day-to-day supervision can be carried out by a trainee research assistant (AIO), postdoc or researcher.

Doelgroep
Students MSc Earth science year 2

Overige informatie
Participation in this compulsory component is only permitted if the student meets the relevant requirements for admission. These requirements are detailed in the Internship guidelines of Earth science (on
Blackboard) and in the Academic and Examination Regulations.
The work-based placement is subject to the FALW document: "Student placement (internship) and literature regulations". These regulations

require detailed written agreements between supervisors and student that specify the conditions for the Master research project. This agreement should be sent for approval by the science communication co-ordinator at least two weeks before the planned start of the work-based placement. If the proposal is of sufficient quality, you can start your internship. If not, you'll need to adapt your proposal and send it for approval again. You can only start your internship after your research design has been approved.
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 Earth science Examination Board.
Information on Master internships is made available on Blackboard.

Research Internship Science Communication

Vakcode	AM_1162 ()
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	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). One of the two possible formats is the full Research Internship. 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-baed placement

Toetsvorm
Written report and oral presentation.
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 day-to-day supervision can be carried out by a trainee research assistant (AIO), postdoc or researcher.

Doelgroep
Students Earth science year 2

Overige informatie
Participation in this compulsory component is only permitted if the student meets the relevant requirements for admission. These requirements are detailed in the Internship guideline of science communication (on
Blackboard) and in the Academic and Examination Regulations.
The work-based placement is subject to the FALW document: “Student placement (internship) and literature regulations”. These regulations require detailed written agreements between supervisors and student that specify the conditions for the Master research project. This agreement should be sent for approval by the science communication internship or master co-ordinator
at least two weeks before the planned start of the work-based placement.
If the proposal is of sufficient quality, you can start your internship.
If not, you’ll need to adapt your proposal and send it for approval again. You can only start your internship after your research design has been approved.
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 earth science Examination Board.
Information on Master internships is made available on Blackboard.

Research methods for analyzing complex problems

Vakcode	AM_1182 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	A. van Luijn MSc
Examinator	A. van Luijn MSc
Lesmethode(n)	Hoorcollege, Werkcollege, Computerpracticum
Niveau	400

Doel vak
The objectives of this course are:

- To understand the differences between beta- and gamma research;
- To acquire insight in and understanding of a real world research process, including knowledge of the character of complex societal issues and the needs, advantages and disadvantages of real world research;
- To acquire insight into various quantitative and qualitative research methods, their underlying theoretical concepts and their relative strengths and weaknesses;

- Being able to apply these various quantitative and qualitative research methods in a specific societal context;
- To interpret quantitative and qualitative findings;
- Being able to create an adequate research design for the investigation of a specific complex societal problem.

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

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

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

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

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

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

Toetsvorm
The course grade is based on the group assignment 'research design' and the
exam. Both aspects need to be graded 6.0 or higher.

Exam 50% of total grade
Group assignment 'research design' 50% of total grade

Literatuur
The literature of this course consists of selected scientific articles that are provided on blackboard, and the books:
- Verschuren, D.E. and Doorewaard, H. (2010). Designing a Research Project
(2nd edition)Eleven International Publishing, the Hague. ISBN 978-90-

5931-572-3.
- Gray, D.E. (2014) Doing Research in the Real World (3rd edition)Sage Publications Ltd, United Kingdom. ISBN 978-1-4462-6019-7

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

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

Intekenprocedure
VUnet

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

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

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

Lecturer:
dr. M.E. Arentshorst

Researching science research

Vakcode	X_432849 ()
Periode	Periode 4+5
Credits	12.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. ir. B.A.G. Bossink
Examinator	prof. dr. ir. B.A.G. Bossink
Docent(en)	prof. dr. ir. B.A.G. Bossink
Lesmethode(n)	Werkcollege
Niveau	500

Doel vak
To study strategy, structure, culture and the environment of a lab research group or R&D group in practice. Students learn how a lab research group or R&D group in life & health practice or energy & sustainability practice functions, on a daily basis, on a yearly basis,

related to other commercial functions in its direct environment, and related to the strategy of the organization in which it is situated.

Inhoud vak
Road mapping-assignment to study strategy, structure, culture and environment of a lab research group or R&D group in life & health practice or energy & sustainability practice.
- Students learn to develop a case study research plan that enables them to study a lab or R&D group in practice
- Students learn to carry out the planned case study research steps
- Students develop an report in which they describe and discuss strategy, structure, culture of a lab research or R&D group in practice
- Students learn to orally present and discuss their finding with a student-audience.

Onderwijsvorm
- Weekly interactive assignment sessions;
- Plenary presentation sessions;

Toetsvorm
Students work on an assignment and write a report on the functioning of a lab group or R&D group they studied by means of a case study research method. The assignment is related to 12 EC of the track courses a student has chosen in his/her personal education plan. To pass a weighted average of 5.5 or higher should be scored for the assignment (60%) and presentations (40%).

Literatuur
To be announced on blackboard.

Vereiste voorkennis
12 EC of science courses

Doelgroep
Master SBI, track Life & Health and Energy & Sustainability

SBI Project & Master Thesis

Vakcode	X_432735 ()
Periode	Ac. Jaar (september)
Credits	36.0
Voertaal	Nederlands
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	E.H. Kroezinga
Examinator	prof. dr. ir. B.A.G. Bossink
Docent(en)	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 five to six 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
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. Internship, thesis, final presentation

Toetsvorm
Work execution: 40%
Aptitude test (the thesis): 45%
Final oral presentation: 15%

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

Other literature as described in the plan of action.

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.

SBI Research Methodology

Vakcode	X_432846 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. P.C. van der Sijde
Examinator	prof. dr. P.C. van der Sijde

Lesmethode(n)	Hoorcollege
Niveau	500

Doel vak
The objective of the course is to learn about the different methodological traditions in science. SBI is a multidisciplinary study in which (natural) sciences, social and business studies are combined. Each with its own pedigree. The students learn about the similarities and differences and how to cope with methodological issues in their research projects.

Inhoud vak
The students are introduced to the different methodological traditions (- natural - sciences, social and business studies) and learn about what it means to do research. Students learn to analyze articles, formulate research question, qualitative and quantitative research, setting up research and analyzing data.

Onderwijsvorm
The course has two parts:
Part 1 - classes and workgroups. theory is introduced in the classes and via assignment elaborated in work groups.
Part 2 - the students coach Bachelorstudents in writing their Plan of Action for the Bachelorthesis.

Toetsvorm
1. Exam (30%)
2. Research plan for a project (50%)
3. Reflection report of the coaching of Bachelor students (20%)

Literatuur
Bhattachjee, A. (2012) Social science research. (Available via Internet)
Selected articles to be announced

Doelgroep
SBI students preparing for their thesisproject

Intekenprocedure
via the normal procedures

Science and Communication

Vakcode	AM_470587 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	P. Klaassen MA
Examinator	P. Klaassen MA
Docent(en)	dr. J.F.H. Kupper, drs. ir. M.G. van der Meij, P. Klaassen MA
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Doel vak
a) Gain theoretical insight in the nature of science,
b) Gain theoretical insight in the nature of communication,
c) Gain theoretical insight in the relationship between science and society,
d) Gain insight in the role of science communication in this relationship,
e) Acquire knowledge of different theories and models of science communication,
f) Acquire knowledge of different strategies, media and activities for science communication,
g) Learn how to practically apply theoretical concepts from the field of science communication in communicating science,
h) Develop practical skills for science communication (especially writing and giving oral presentations).

Inhoud vak
Science is all around us and shapes our lives in many different ways. From the vaccines you need to get when traveling abroad to the smartphone you use on a daily basis, and from the public transportation you use to get to the university to the ingredients of your toothpaste: scientific knowledge is elemental to all of these. Simultaneously, society shapes the ways in which science and technology develop too. Science, technology and society influence each other continuously—or, to put it differently, they ‘communicate’.

Students of the Science Communication specialization are expected to become experts in understanding and designing interactions between science and society. In order to make this interaction fruitful and valuable for both science and society, it is first of all important to gain theoretical knowledge about science, about communication and about science communication. Science and Communication provides students with the theoretical and conceptual foundations of the discipline of science communication. Thus, you will develop an in-depth understanding of communication processes at the core of several interfaces, including those between scientists from different disciplines, between different sciences and their stakeholders, and between science and the public.

Onderwijsvorm
Lectures (18 h)
Workgroups (15 h)
Home-study for group assignments (12h)
Home-study for individual assignments/exam (100h)

Toetsvorm
• Your participation, two (small) individual assignments (1A & 1B) a pitch presentation and a "job application". All these are assessed as pass or fail.
If you pass all of them, you have earned the first 10% of your final mark. For each one you fail, you have to do an alternative assignment that has to be handed in on Friday October 22nd. Nota bene: if you fail your participation, this cannot be compensated with an alternative assignment!

• A group assignment in which you develop a label to an exhibit at a science museum and write an accompanying essay. 10%

• A review of a science communication effort of your own choosing (an exhibit at a science center or museum, a public lecture, a (popular) science book, et cetera...). 10%

• "TED-talk" in which you present the research you did (e.g. for your Bsc thesis or (first) Msc internship). 20%

• Exam. 50%

Literatuur
Academic articles. Direct links to articles will be provided on BlackBoard.

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 Historical Perspective

Vakcode	X_400424 (400424)
Periode	Periode 4+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
Bachelor degree

Doelgroep
Master students in the sciences who enjoy history or (historical) reflection on their field of subject, as well as master students in history, who want to acquire more understanding in the role of science in society.

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, Werkcollege
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 science and technology studies and communication science perspective
- the nature and course of interpersonal and group communication processes relevant to the formal and informal dialogue between science and society
- the nature and form of dialogical science communication, aimed at reflective learning and mutual understanding

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

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 refle ction report.
Every course week is completed with a mini-exam.

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

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	XMU_437030 ()
Periode	Periode 4+5
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017/zoek-vak

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

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
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
- science reporting using videos
- 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 defendable position with regard to these issues.
Guest lectures provide insight into the professional practice of science journalists. The guest speakers work as freelancer, editor or producer at diverse science media, such as newspapers (NRC, Volkskrant),

magazines (NWT), internet (Noorderlicht) and radio (Labyrint). Finally, the course trains specific skills that you need as a science journalist, such as popular writing, popular science videos, interviewing, conceptual analysis and program design.

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 (remaining hours).

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, Werkcollege, Veldwerk
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 development of exhibit experience and content design.
- 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
Workgroups
Workshops
Home-study for group assignments
Home-study for individual assignments
Field work

Toetsvorm
Group assignments (45%), final presentation (15%), and individual assessment(s) (40%). For all assignments and assessments 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
It is possible to follow the course as an elective course outside of one of the science communication master specialisations of FALW/FEW. In that case additional reading may be required depending on the student's background.

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

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

Science project

Vakcode	XM_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. 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 Computing and Programming

Vakcode	X_435076 (435076)
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. L. Visscher
Examinator	prof. dr. L. Visscher
Docent(en)	prof. dr. L. Visscher
Lesmethode(n)	Hoorcollege, Practicum
Niveau	500

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

Overige informatie
This course is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-science@uva.nl, +31 (0)20 525 7100. Enrolment via https://m.sis.uva.nl/vakaanmelden is required. For courses taught in period 1 and period 2, enrolment via https://datanose.nl/#specialenrol is required.

Separation Sciences

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

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017/zoek-vak

Overige informatie
This course is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-science@uva.nl, +31 (0)20 525 7100. Enrolment via https://m.sis.uva.nl/vakaanmelden is required. For courses taught in period 1 and period 2, enrolment via https://datanose.nl/#specialenrol is required.

Societal entrepreneurship in health and life sciences

Vakcode	AM_470575 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	L.H.M. van de Burgwal MSc
Examinator	L.H.M. van de Burgwal MSc
Docent(en)	prof. dr. H.J.H.M. Claassen, prof. dr. E. Masurel
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Doel vak
This course focuses on societal aspects of entrepreneurship. During the course you study the meaning of societal and responsible entrepreneurship in a concrete setting. In the course theoretical insights are combined with practical knowledge regarding business plans. Lecturers from Athena and experts from the field discuss various relevant topics, such as: the main elements of a business plan, how to write an executive summary, the role of societal impact, and elements of CSR. The course is relevant for a wide range of business cases in the health and life sciences, ranging from starting an NGO-like organization, to starting a strong business-driven life sciences corporation.

This course is thus intended for students that have truly considered becoming entrepreneurs themselves. To this end, we specifically encourage students to formulate a business case (as a group of 3 students) before registering for this course.

Learning objectives

- Obtain knowledge about and insight in the relevance of entrepreneurship and innovation for science disciplines.
- 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 business plan on how to bring an innovation to the market.
- 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 findings from the health and life sciences and business ideas for a knowledge-based economy.

Inhoud vak
This course consists of both a theoretical and a practical component. Both components run simultaneously so that the theoretical knowledge can be applied to the development of the business plan. In the theoretical component you learn about societal entrepreneurship. We address questions such as: What is entrepreneurship? What are societal entrepreneurs? What is the role of innovation in entrepreneurship? What

is corporate social responsibility (CSR)? How can we judge the feasibility of entrepreneurial ambitions?

The practical comment focuses on creating a business plan based on a real-life business case. Based on the Business Model Canvas (Osterwalder & Pigneur, 2010) you develop a business plan covering aspects such as value propositions, key activities, key partners, customer segments, cost structure, and revenue streams. In setting up this business plan, societal aspects of entrepreneurship should play a key role. A jury of financers judges the business plans on creativity and feasibility.

Onderwijsvorm
Lectures and workshops are key elements of this course. Each week several lectures are given. These lectures provide key knowledge for both the exam and the business plan. Additionally, each week students have workshops in which specific parts of the business plan are further developed. Attending the workshops is compulsory.

Schedule and study time

The total study time is 160 hours. The following hours are contact hours:

-lectures: 42 hours
-workshops: 14 hours
-exam: 3 hours
-writing business plan: 70 hours
-self-study for remaining hours

Toetsvorm
Both the exam and the business plan determine 50% of the grade each. The exam and business plan must be of sufficient quality to pass the course.

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.

Statistical Theory of Complex Molecular Systems

Vakcode	XMU_428520 (428520)
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

http://studiegids.uva.nl/xmlpages/page/2015-2016/zoek-vak/vak/17065

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

Supramolecular Chemistry and Nanomaterials

Vakcode	XMU_435653 (435653)
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Lesmethode(n)	Hoorcollege
Niveau	400

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

Overige informatie
This course is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-science@uva.nl, +31 (0)20 525 7100.
Enrolment via https://m.sis.uva.nl/vakaanmelden is required.
For courses taught in period 1 and period 2, enrolment via https://datanose.nl/#specialenrol is required.

Synthetic Organic Chemistry

Vakcode	XMU_435665 (435665)
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	500

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

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

Teaching Assistant

Vakcode	XM_432741 ()
Periode	Ac. Jaar (september)
Credits	3.0

Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.E. van Muijlwijk-Koezen
Examinator	prof. dr. ir. R.V.A. Orru
Niveau	400

Doel vak
the main goal is to improve your teaching skills and get familiar with the specific pharmaceutical sciences/chemistry didactics.

Onderwijsvorm
hands on course:
You will become a member of the team of supervisors for practical courses or working classes for undergraduates and assist in the lab or classroom. With the aid of feedback and intervision, you will improve via learning by doing. The theoretical background has been taught in the course 'tutoring students'

Toetsvorm
Execution during the course and concluding reflective session

Vereiste voorkennis
X_432625, period 2, tutoring students

Doelgroep
mDDS, mChem, PhD

Intekenprocedure
Contact your master coordinator IN TIME. the earlier the better

Overige informatie
Limited seats available, fixed periods

Teaching Assistant

Vakcode	XM_432742 ()
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.E. van Muijlwijk-Koezen
Examinator	prof. dr. ir. R.V.A. Orru
Niveau	400

Doel vak
The main goal is to improve your teaching skills and get familiar with the specific pharmaceutical sciences/chemistry didactics.

Onderwijsvorm
hands on course:
You will become a member of the team of supervisors for practical courses or working classes for undergraduates and assist in the lab or classroom. With the aid of feedback and intervision, you will improve via learning by doing. The theoretical background has been taught in the

course 'tutoring students'

Toetsvorm
Execution during the course and concluding reflective session

Vereiste voorkennis
X_432625, period 2, tutoring students

Doelgroep
mDDS, mChem, PhD

Intekenprocedure
Contact your master coordinator IN TIME. the earlier the better

Overige informatie
Limited seats available, fixed periods

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. P.R. Tuertscher
Examinator	dr. P.R. Tuertscher
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Doel vak
After finishing this course, students will be able to:
• Explain challenges, concepts, and theories related 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 within 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 contexts, 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 on 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 on Blackboard.

Aanbevolen voorkennis
Basic knowledge of innovation management and organization studies

The analytical Chemist in Industry

Vakcode	XMU_437005 (437005)
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Examinator	prof. dr. ir. R.V.A. Orru
Niveau	400

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017/zoek-vak

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

Transdisciplinarity and Transition

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

Doel vak
• You can reproduce and apply the essence of current transition theories, e.g. the multi-level perspective.

• You can design a tailor made transdisciplinary approach to identify and cope with hurdles in an innovation trajectory, based on amongst others the Interactive Learning and Action approach.
• You are able to make an in-depth semi-structured interview guide.
• You are able to execute, transcribe, analyse and summarise an in-depth interview.
• You are able to apply analytical tools, such as causal analysis, actor analysis, fact-value framing, SWOT.
• Your are able to integrate multi-disciplinary knowledge and multi-stakeholder interests into a management advice for a transition process.

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 focuses on the analytical skills necessary to guide and advice a niche innovation.
Guiding and advising implies that you are aware of the social forces prohibiting a breakthrough and how to identify and implement tailor made solutions to deal with these forces. Therefore, this course introduces you to several theories related to innovation and societal forces, 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, including transitions. Transitions are referred to as complex because different stakeholder groups are involved (e.g. industry, academia, consumers and NGOs) and these stakeholders often have different visions on what is "best" for society.
On the basis of 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 the Interactive learning and Action approach, how to use an actor analysis to delineate you allies and enemies, how to use semi-structured interviews to deepen your understanding of reasons behind problems, how to construct a causal analysis to understand the complexity of the problems you face, and how a SWOT analysis can help to identify strategic priorities.
Parallel to the lectures you will work in a group on an advice regarding an innovation, conducting interviews with key players and analysing the complexity of interests.

Onderwijsvorm
Lectures, skills training, coach meetings, self-study and project
The total study time is 6 EC (6x28 = 168 hours). Tuition methods include lectures, training sessions, self-study, and a group project on a specific case. In the case study, you will integrate different theories and tools, and apply the toolbox introduced during the lectures.
- lectures: 12 hours
- coach meetings: 16 hours
- skills training: 6 hours
- execution of 2 interviews: 2 hours
- execution of expert meeting: 2 hours
- presentation of project results: 4 hours

- self study and project: 124 hours
- examination: 2 hours (two mini-exams of 60 minutes)
Please note that attendance to the project meetings (coach meetings and skills training) is compulsory. Attendance to the lectures is highly recommended since relying on self-study alone has proven to be insufficient to pass the mini-exams. 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 (including both mini-exams) have to be concluded with the grade of 5.5 or higher.

Team project report (40%)
Team project presentation (10%)
Individual attitude and skills assessment (20%)
2 individual written mini-exams (30%)
Resits for the mini-exams will be organized in the first resit period after the end of the course (February).

Literatuur
Book: Biotechnology and Food
Articles are made available via Blackboard

Vereiste voorkennis
Proven knowledge of organisations 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 conceptualisation of the complexity, data collection, interviews, analysis, validation of preliminary result with external experts, and finally presenting your change strategy. You will need to use and integrate all knowledge you acquired before.

Transport Phenomena

Vakcode	XMU_420075 (420075)
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	500

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

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

Tutoring Students

Vakcode	X_432625 (432625)
Periode	Periode 2
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. M. Wijtmans
Examinator	dr. M. Wijtmans
Docent(en)	dr. M. Wijtmans, dr. H.B. Westbroek
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
mDDS

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 for 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).

Ultrafast Laser Physics

Vakcode	X_422556 (422556)
Periode	Periode 4
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

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

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

Understanding Molecular Simulation

Vakcode	XMU_432703 (432703)
Periode	Periode 3
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

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

Understanding Quantum Chemistry

Vakcode	X_422557 (422557)
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. L. Visscher
Examinator	prof. dr. L. Visscher
Docent(en)	prof. dr. L. Visscher, dr. I.A.C. Infante
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	400

Inhoud vak
http://studiegids.uva.nl/xmlpages/page/2016-2017-en/search-course

Overige informatie
This course is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-science@uva.nl, +31 (0)20 525 7100. Enrolment via https://m.sis.uva.nl/vakaanmelden is required. For courses taught in period 1 and period 2, enrolment via https://datanose.nl/#specialenrol is required.