



Medical Natural Sciences MSc

Vrije Universiteit Amsterdam - Faculteit der Exacte Wetenschappen - M Medical Natural Sciences - 2013-2014

Structure of the training

The Master's programme of Medical Natural Sciences offers three different variants for graduation:

- Research variants (O - variant)
 - Medical physics
 - Physics of Life
 - Molecular Clinical Diagnostics
 - Medical physiology
- Society oriented variant (M - variant)
- Communication variant (C - variant)
- Education variant (E - variant)

Schematic overview of the Master course Medical Natural sciences (in cp):

Variant	O	M	C	E
Compulsory courses (Major)	27, 30 or 36	18	18	18
Research project (Major)	39	30	30	30
Literature study	6 or 12	6	6	6
Minor programme (obligatory in O-variant)	21	-	-	-
Internship (e.g. at a company)	-	30	30	-
M or C projects	-	30	30	-
High school teacher education	-	-	-	60
Ethics	3	3	3	3
Writing a scientific article	3	3	3	3
Optional program O-variant, for example - Deficiency courses - Extension research project - Extension literature study - extra courses	12, 15 or 18			
Total (cp)	120	120	120	120

Inhoudsopgave

Communication variant	1
Courses for Communication Part	1
MSc Biology, Communication Specialisation	1
Internship Science Communication	1
Course modules Communication spec.	2
MNS courses for C-E-M variant	2
Courses in track Molecular Clinical Diagnostics (C, E or M-variant)	2
Compulsory choice (18 ec track specific)	2
Compulsory Courses	3
Courses in track Medical Physics (C, E or M-variant)	3
Compulsory choice (18 ec track specific)	3
Compulsory Courses	4
Courses in track Medical Physiology (C, E or M-variant)	4
Compulsory choice (18 ec track specific)	4
Compulsory courses	5
Courses in track Physics of Life (C, E or M-variant)	5
Compulsory choice (18 ec track specific)	5
Compulsory Courses	5
Compulsory choice for all tracks	6
Education variant	6
Courses for Education Part	6
Leraar voorbereidend hoger onderwijs in Natuurkunde verplicht	6
Leraar voorbereidend hoger onderwijs in Scheikunde verplicht	7
MNS courses for C-E-M variant	7
Courses in track Molecular Clinical Diagnostics (C, E or M-variant)	7
Compulsory choice (18 ec track specific)	8
Compulsory Courses	8
Courses in track Medical Physics (C, E or M-variant)	8
Compulsory choice (18 ec track specific)	8
Compulsory Courses	9
Courses in track Medical Physiology (C, E or M-variant)	9
Compulsory choice (18 ec track specific)	9
Compulsory courses	10
Courses in track Physics of Life (C, E or M-variant)	10
Compulsory choice (18 ec track specific)	10
Compulsory Courses	11
Compulsory choice for all tracks	11
Research Variant Medical Physics	11
Minor Research Project MNS	12
Optional courses (18 ec compulsory)	12
Colloquium / Literature thesis MNS	13
Colloquium / Literature thesis (1 out of 2)	13
Optional Colloquium Literature study (free choice)	13

Selective elective Courses	14
Master Research Project MNS	14
Compulsory Courses	14
Compulsory choice for all tracks	15
Research Variant Physics of Life	15
Minor Research Project MNS	16
Optional courses (12 ec compulsory)	16
Colloquium / Literature thesis MNS	17
Optional Colloquium Literature study (free choice)	17
Aangeraden keuzevakken	17
Master Research Project MNS	18
Compulsory Courses PoL	18
Compulsory choice for all tracks	18
Research Variant Molecular Clinical Diagnostics	19
Colloquium / Literature Thesis, 12 e	19
Minor Research Project MNS	20
Optional courses	21
Colloquium / Literature thesis MNS	21
Colloquium / Literature thesis (1 out of 2)	21
Compulsory choice Colloquium / Literature study (extension to 12 ec)	21
Recommended Optional Courses	22
Master Research Project MNS	22
Compulsory Courses	22
Compulsory choice for all tracks	23
Research Variant Medical Physiology	23
Minor Research Project MNS	23
Optional courses (18 ec compulsory)	24
Colloquium / Literature thesis MNS	24
Colloquium / Literature thesis (1 out of 2)	25
Compulsory choice Colloquium / Literature study (extension to 12 ec)	25
Deficientievakken	25
Master Research Project MNS	25
Compulsory Courses	26
Compulsory choice for all tracks	26
Society Oriented Variant for Medical Natural Sciences	26
Courses for Society Oriented Part	27
MSc Biology, Societal specialisation	27
MNS courses for C-E-M variant	27
Courses in track Molecular Clinical Diagnostics (C, E or M-variant)	28
Compulsory choice (18 ec track specific)	28
Compulsory Courses	28
Courses in track Medical Physics (C, E or M-variant)	28
Compulsory choice (18 ec track specific)	29
Compulsory Courses	29
Courses in track Medical Physiology (C, E or M-variant)	29

Compulsary choice (18 ec track specific)	29
Compulsory courses	30
Courses in track Physics of Life (C, E or M-variant)	30
Compulsary choice (18 ec track specific)	30
Compulsory Courses	31
Compulsory choice for all tracks	31
Vak: Advanced Cardiac Diagnostics (Periode 3+4+5)	31
Vak: Advanced Medical Technology (Periode 5)	32
Vak: Advanced Spectroscopy (Periode 6)	33
Vak: Algemene didactiek en Pedagogiek I (Semester 1, Semester 2)	34
Vak: Algemene Didactiek en Pedagogiek II (Semester 1, Semester 2)	35
Vak: Analysis of Governmental Policy (Periode 1)	36
Vak: Bio-analysis & Clinical Diagnostics (Periode 1)	37
Vak: Biomedical Modelling and Simulation (Periode 1)	38
Vak: Biomedical Optics (Periode 4)	39
Vak: Biophotonics I: Microspectroscopy (Periode 3)	40
Vak: Biophotonics III: Practical Training (Periode 3)	40
Vak: Business Management in Health and Life Sciences (Periode 2)	41
Vak: Clinical development and clinical trials (Periode 3)	43
Vak: Colloquium / Literature thesis Medical Natural Sciences - Analytische Chemie en Toegepaste Spectroscopie (Ac. Jaar (september))	44
Vak: Colloquium / Literature thesis Medical Natural Sciences - Biofysica (Ac. Jaar (september))	45
Vak: Colloquium / Literature thesis Medical Natural Sciences - Fysica van complexe systemen (Ac. Jaar (september))	45
Vak: Colloquium / Literature thesis Medical Natural Sciences - Vumc-klinische chemie (Ac. Jaar (september))	45
Vak: Colloquium / Literature thesis MNS - Medical Physics (Ac. Jaar (september))	45
Vak: Colloquium / Literature thesis MNS - Medical Physics (Ac. Jaar (september))	45
Vak: Colloquium / Literature thesis MNS - Medical Physiology (Ac. Jaar (september))	46
Vak: Colloquium / Literature thesis MNS - Medical Physiology (Ac. Jaar (september))	46
Vak: Colloquium / Literature thesis MNS - Molecular Clinical Diagnostics (Ac. Jaar (september))	46
Vak: Colloquium / Literature thesis MNS - Molecular Clinical Diagnostics (Ac. Jaar (september))	47
Vak: Colloquium / Literature thesis MNS - Physics of Life (Ac. Jaar (september))	47
Vak: Colloquium / Literature thesis MNS - Physics of Life (Ac. Jaar (september))	47
Vak: Communication, Organization and Management (Periode 2)	48
Vak: Differentiëren en integreren 3 (Periode 4)	49
Vak: Disability and Development (Periode 2)	50
Vak: Drug-induced Stress and Cellular Responses (Periode 2)	51
Vak: Dynamics of Biomolecules and Cells (Periode 4)	52
Vak: Elektronica en signaalverwerking (Periode 4)	53
Vak: Entrepreneurship in Health and Life Sciences (Periode 2)	55
Vak: Ethics in Life Sciences (Periode 3)	56
Vak: Health, Globalisation and Human Rights (Periode 2)	58
Vak: Inleiding bioinformatica 2 (Periode 4)	59
Vak: Internship Communication Specialisation (Ac. Jaar (september))	60
Vak: Internship Societal Specialisation (Ac. Jaar (september))	60

Vak: Introductie Medische Beeldbewerking (Periode 2)	60
Vak: Lasers and Quantum Optics (Periode 1)	61
Vak: Major Research Project MNS Medical Physics (Ac. Jaar (september))	62
Vak: Major Research Project MNS Medical Physics (Ac. Jaar (september))	62
Vak: Major Research Project MNS Medical Physics (Ac. Jaar (september))	63
Vak: Major Research Project MNS Medical Physiology (Ac. Jaar (september))	63
Vak: Major Research Project MNS Medical Physiology (Ac. Jaar (september))	63
Vak: Major Research Project MNS Medical Physiology (Ac. Jaar (september))	63
Vak: Major Research Project MNS Physics of Life (Ac. Jaar (september))	63
Vak: Major Research Project MNS Physics of Life (Ac. Jaar (september))	64
Vak: Major Research Project MNS Physics of Life (Ac. Jaar (september))	64
Vak: Master Project Medical Physics (M,C,E-var.) (Ac. Jaar (september))	64
Vak: Master Project Medical Physiology (M,C,E-var.) (Ac. Jaar (september))	64
Vak: Master Project Molecular Clinical Diagnostics (for M,C,E-variant) (Ac. Jaar (september))	65
Vak: Master Project Physics of Life (M,C,E-var.) (Ac. Jaar (september))	65
Vak: Medical Imaging (Periode 5)	65
Vak: Minor Research Project MNS Medical Physics (Ac. Jaar (september))	66
Vak: Minor Research Project MNS Medical Physics (Ac. Jaar (september))	66
Vak: Minor Research Project MNS Medical Physics (Ac. Jaar (september))	66
Vak: Minor Research Project MNS Medical Physiology (Ac. Jaar (september))	66
Vak: Minor Research Project MNS Medical Physiology (Ac. Jaar (september))	67
Vak: Minor Research Project MNS Medical Physiology (Ac. Jaar (september))	67
Vak: Minor Research Project MNS Molecular Clinical Diagnostics (Ac. Jaar (september))	67
Vak: Minor Research Project MNS Molecular Clinical Diagnostics (Ac. Jaar (september))	68
Vak: Minor Research Project MNS Molecular Clinical Diagnostics (Ac. Jaar (september))	68
Vak: Minor Research Project MNS Physics of Life (Ac. Jaar (september))	69
Vak: Minor Research Project MNS Physics of Life (Ac. Jaar (september))	69
Vak: Minor Research Project MNS Physics of Life (Ac. Jaar (september))	69
Vak: MNS Major Research Project Molecular Clinical Diagnostics (Ac. Jaar (september))	69
Vak: MNS Major Research Project Molecular Clinical Diagnostics (Ac. Jaar (september))	70
Vak: MNS Major Research Project Molecular Clinical Diagnostics (Ac. Jaar (september))	70
Vak: Omics-procedures in molecular clinical Diagnostics (Periode 5)	71
Vak: Parameter Estimation Applied to Medical and Biological Sciences (Periode 4)	72
Vak: Pathophysiology of Heart and Circulation (Periode 1)	72
Vak: Physics of Organs 1: Cardio-Pulmonary Physics (Periode 1)	73
Vak: Physics of Organs 2: Sensory Organs and Bioelectricity (Semester 1)	73
Vak: Policy, Politics and Participation (Periode 2)	74
Vak: Praktijk I (Semester 1, Semester 2)	75
Vak: Praktijk II (Semester 1, Semester 2)	76
Vak: Professionele ontwikkeling en onderzoek I (Semester 1, Semester 2)	77
Vak: Professionele ontwikkeling en onderzoek II (Semester 1, Semester 2)	78
Vak: Qualitative and Quantitative Research Methods (Periode 1)	79
Vak: Science and Communication (Periode 1)	80
Vak: Science in Dialogue (Periode 2)	82
Vak: Science Journalism (Periode 2)	83

Vak: Science Museology (Periode 3)	84
Vak: Scientific Writing in English for Medical Natural Sciences (Periode 3)	85
Vak: Signal Transduction in Health and Disease (Periode 2)	87
Vak: Soft Condensed Matter and Biological Physics (Periode 2)	88
Vak: Statistical Theory of Complex Molecular Systems (Periode 1)	89
Vak: Vakdidactiek Natuurkunde I (Semester 1, Semester 2)	89
Vak: Vakdidactiek Natuurkunde II (Semester 1, Semester 2)	90
Vak: Vakdidactiek Scheikunde I (Semester 1, Semester 2)	91
Vak: Vakdidactiek Scheikunde II (Semester 1, Semester 2)	91
Vak: Verdieping (Semester 1, Semester 2)	92
Vak: Voortgezette Biostatistiek (Periode 4)	93

Communication variant

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

Opleidingsdelen:

- [Courses for Communication Part](#)
- [MNS courses for C-E-M variant](#)

Courses for Communication Part

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

Opleidingsdelen:

- [MSc Biology, Communication Specialisation](#)

MSc Biology, Communication Specialisation

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

Opleidingsdelen:

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

Internship Science Communication

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

Vakken:

Naam	Periode	Credits	Code
------	---------	---------	------

Internship Communication Specialisation	Ac. Jaar (september)	30.0	AM_471148
---	----------------------	------	-----------

Course modules Communication spec.

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

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

Vakken:

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

MNS courses for C-E-M variant

MNS courses for C-variant. 60 ec of MNS courses from the specialization has to be chosen in consultation with the master coordinator.

Opleidingsdelen:

- [Courses in track Molecular Clinical Diagnostics \(C, E or M-variant\)](#)
- [Courses in track Medical Physics \(C, E or M-variant\)](#)
- [Courses in track Medical Physiology \(C, E or M-variant\)](#)
- [Courses in track Physics of Life \(C, E or M-variant\)](#)
- [Compulsory choice for all tracks](#)

Courses in track Molecular Clinical Diagnostics (C, E or M-variant)

Opleidingsdelen:

- [Compulsory choice \(18 ec track specific\)](#)
- [Compulsory Courses](#)

Compulsory choice (18 ec track specific)

Vakken:

Naam	Periode	Credits	Code
------	---------	---------	------

Advanced Spectroscopy	Periode 6	6.0	X_432767
Bio-analysis & Clinical Diagnostics	Periode 1	6.0	X_432765
Drug-induced Stress and Cellular Responses	Periode 2	6.0	X_432536
Omics-procedures in molecular clinical Diagnostics	Periode 5	6.0	X_432766
Pathophysiology of Heart and Circulation	Periode 1	6.0	M_CPATHO09
Signal Transduction in Health and Disease	Periode 2	6.0	X_432535

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Colloquium / Literature thesis MNS - Molecular Clinical Diagnostics	Ac. Jaar (september)	6.0	X_432769
Master Project Molecular Clinical Diagnostics (for M,C,E-variant)	Ac. Jaar (september)	30.0	X_432628
Scientific Writing in English for Medical Natural Sciences	Periode 3	3.0	X_420563

Courses in track Medical Physics (C, E or M-variant)

Opleidingsdelen:

- [Compulsory choice \(18 ec track specific\)](#)
- [Compulsory Courses](#)

Compulsory choice (18 ec track specific)

Vakken:

Naam	Periode	Credits	Code
Advanced Medical Technology	Periode 5	6.0	X_437026
Biomedical Modelling and Simulation	Periode 1	6.0	X_430112
Biomedical Optics	Periode 4	6.0	X_428529

Parameter Estimation Applied to Medical and Biological Sciences	Periode 4	6.0	X_432631
Physics of Organs 1: Cardio-Pulmonary Physics	Periode 1	6.0	X_428527
Physics of Organs 2: Sensory Organs and Bioelectricity	Semester 1	6.0	X_428528
Soft Condensed Matter and Biological Physics	Periode 2	6.0	X_420167

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Colloquium / Literature thesis MNS - Medical Physics	Ac. Jaar (september)	6.0	X_432611
Master Project Medical Physics (M,C,E-var.)	Ac. Jaar (september)	30.0	X_432627
Scientific Writing in English for Medical Natural Sciences	Periode 3	3.0	X_420563

Courses in track Medical Physiology (C, E or M-variant)

Opleidingsdelen:

- Compulsory choice (18 ec track specific)
- Compulsory courses

Compulsory choice (18 ec track specific)

Vakken:

Naam	Periode	Credits	Code
Advanced Cardiac Diagnostics	Periode 3+4+5	3.0	M_CCARDIA09
Bio-analysis & Clinical Diagnostics	Periode 1	6.0	X_432765
Biomedical Modelling and Simulation	Periode 1	6.0	X_430112
Drug-induced Stress and Cellular Responses	Periode 2	6.0	X_432536
Pathophysiology of Heart and Circulation	Periode 1	6.0	M_CPATHO09

Signal Transduction in Health and Disease	Periode 2	6.0	X_432535
---	-----------	-----	----------

Compulsory courses

Vakken:

Naam	Periode	Credits	Code
Colloquium / Literature thesis MNS - Medical Physiology	Ac. Jaar (september)	6.0	X_432613
Master Project Medical Physiology (M,C,E-var.)	Ac. Jaar (september)	30.0	X_432626
Scientific Writing in English for Medical Natural Sciences	Periode 3	3.0	X_420563

Courses in track Physics of Life (C, E or M-variant)

Opleidingsdelen:

- Compulsory choice (18 ec track specific)
- Compulsory Courses

Compulsory choice (18 ec track specific)

Vakken:

Naam	Periode	Credits	Code
Biomedical Modelling and Simulation	Periode 1	6.0	X_430112
Biomedical Optics	Periode 4	6.0	X_428529
Biophotonics III: Practical Training	Periode 3	3.0	AM_470630
Dynamics of Biomolecules and Cells	Periode 4	6.0	X_422583
Lasers and Quantum Optics	Periode 1	6.0	X_422539
Parameter Estimation Applied to Medical and Biological Sciences	Periode 4	6.0	X_432631
Soft Condensed Matter and Biological Physics	Periode 2	6.0	X_420167
Statistical Theory of Complex Molecular Systems	Periode 1	6.0	X_428520

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Colloquium / Literature thesis MNS - Physics of Life	Ac. Jaar (september)	6.0	X_432768
Master Project Physics of Life (M,C,E-var.)	Ac. Jaar (september)	30.0	X_432629
Scientific Writing in English for Medical Natural Sciences	Periode 3	3.0	X_420563

Compulsory choice for all tracks

Compulsory choice Ethics for all tracks. Choose one of two.

Vakken:

Naam	Periode	Credits	Code
Ethics in Life Sciences	Periode 3	3.0	AM_470707

Education variant

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

Opleidingsdelen:

- [Courses for Education Part](#)
- [MNS courses for C-E-M variant](#)

Courses for Education Part

Opleidingsdelen:

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

Leraar voorbereidend hoger onderwijs in Natuurkunde verplicht

Vakken:

Naam	Periode	Credits	Code
------	---------	---------	------

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

Leraar voorbereidend hoger onderwijs in Scheikunde verplicht

Vakken:

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

MNS courses for C-E-M variant

MNS courses for C-variant. 60 ec of MNS courses from the specialization has to be chosen in consultation with the master coordinator.

Opleidingsdelen:

- Courses in track Molecular Clinical Diagnostics (C, E or M-variant)
- Courses in track Medical Physics (C, E or M-variant)
- Courses in track Medical Physiology (C, E or M-variant)
- Courses in track Physics of Life (C, E or M-variant)
- Compulsory choice for all tracks

Courses in track Molecular Clinical Diagnostics (C, E or M-variant)

Opleidingsdelen:

- Compulsary choice (18 ec track specific)
- Compulsory Courses

Compulsary choice (18 ec track specific)

Vakken:

Naam	Periode	Credits	Code
Advanced Spectroscopy	Periode 6	6.0	X_432767
Bio-analysis & Clinical Diagnostics	Periode 1	6.0	X_432765
Drug-induced Stress and Cellular Responses	Periode 2	6.0	X_432536
Omics-procedures in molecular clinical Diagnostics	Periode 5	6.0	X_432766
Pathophysiology of Heart and Circulation	Periode 1	6.0	M_CPATHO09
Signal Transduction in Health and Disease	Periode 2	6.0	X_432535

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Colloquium / Literature thesis MNS - Molecular Clinical Diagnostics	Ac. Jaar (september)	6.0	X_432769
Master Project Molecular Clinical Diagnostics (for M,C,E-variant)	Ac. Jaar (september)	30.0	X_432628
Scientific Writing in English for Medical Natural Sciences	Periode 3	3.0	X_420563

Courses in track Medical Physics (C, E or M-variant)

Opleidingsdelen:

- Compulsary choice (18 ec track specific)
- Compulsory Courses

Compulsary choice (18 ec track specific)

Vakken:

Naam	Periode	Credits	Code
Advanced Medical Technology	Periode 5	6.0	X_437026
Biomedical Modelling and Simulation	Periode 1	6.0	X_430112
Biomedical Optics	Periode 4	6.0	X_428529
Parameter Estimation Applied to Medical and Biological Sciences	Periode 4	6.0	X_432631
Physics of Organs 1: Cardio-Pulmonary Physics	Periode 1	6.0	X_428527
Physics of Organs 2: Sensory Organs and Bioelectricity	Semester 1	6.0	X_428528
Soft Condensed Matter and Biological Physics	Periode 2	6.0	X_420167

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Colloquium / Literature thesis MNS - Medical Physics	Ac. Jaar (september)	6.0	X_432611
Master Project Medical Physics (M,C,E-var.)	Ac. Jaar (september)	30.0	X_432627
Scientific Writing in English for Medical Natural Sciences	Periode 3	3.0	X_420563

Courses in track Medical Physiology (C, E or M-variant)

Opleidingsdelen:

- [Compulsary choice \(18 ec track specific\)](#)
- [Compulsory courses](#)

Compulsary choice (18 ec track specific)

Vakken:

Naam	Periode	Credits	Code
Advanced Cardiac Diagnostics	Periode 3+4+5	3.0	M_CCARDIA09
Bio-analysis & Clinical Diagnostics	Periode 1	6.0	X_432765
Biomedical Modelling and Simulation	Periode 1	6.0	X_430112
Drug-induced Stress and Cellular Responses	Periode 2	6.0	X_432536
Pathophysiology of Heart and Circulation	Periode 1	6.0	M_CPATHO09
Signal Transduction in Health and Disease	Periode 2	6.0	X_432535

Compulsory courses

Vakken:

Naam	Periode	Credits	Code
Colloquium / Literature thesis MNS - Medical Physiology	Ac. Jaar (september)	6.0	X_432613
Master Project Medical Physiology (M,C,E-var.)	Ac. Jaar (september)	30.0	X_432626
Scientific Writing in English for Medical Natural Sciences	Periode 3	3.0	X_420563

Courses in track Physics of Life (C, E or M-variant)

Opleidingsdelen:

- [Compulsory choice \(18 ec track specific\)](#)
- [Compulsory Courses](#)

Compulsory choice (18 ec track specific)

Vakken:

Naam	Periode	Credits	Code
Biomedical Modelling and Simulation	Periode 1	6.0	X_430112
Biomedical Optics	Periode 4	6.0	X_428529
Biophotonics III: Practical Training	Periode 3	3.0	AM_470630

Dynamics of Biomolecules and Cells	Periode 4	6.0	X_422583
Lasers and Quantum Optics	Periode 1	6.0	X_422539
Parameter Estimation Applied to Medical and Biological Sciences	Periode 4	6.0	X_432631
Soft Condensed Matter and Biological Physics	Periode 2	6.0	X_420167
Statistical Theory of Complex Molecular Systems	Periode 1	6.0	X_428520

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Colloquium / Literature thesis MNS - Physics of Life	Ac. Jaar (september)	6.0	X_432768
Master Project Physics of Life (M,C,E-var.)	Ac. Jaar (september)	30.0	X_432629
Scientific Writing in English for Medical Natural Sciences	Periode 3	3.0	X_420563

Compulsory choice for all tracks

Compulsory choice Ethics for all tracks. Choose one of two.

Vakken:

Naam	Periode	Credits	Code
Ethics in Life Sciences	Periode 3	3.0	AM_470707

Research Variant Medical Physics

In addition to the courses below a total of 12 ects is available for optional courses. These credit points can also be used to extend major project, minor project or literature study.

In case of deficiencies these courses are not optional but will be prescribed by the master coordinator.

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

Before starting the Major Research Project or the Minor Research Project at least half of the track specific courses have to be completed.

Master Coordinator:

Dr.ir. Th.J.C. Faes

K T-061
T +31 (0) 20 59 81508
E t.j.c.faes@vu.nl

Opleidingsdelen:

- [Minor Research Project MNS](#)
- [Optional courses \(18 ec compulsory\)](#)
- [Colloquium / Literature thesis MNS](#)
- [Selective elective Courses](#)
- [Master Research Project MNS](#)
- [Compulsory Courses](#)
- [Compulsory choice for all tracks](#)

Minor Research Project MNS

The minor project can be chosen in any track. The minimum length is 21 ec's. By using available free space this can be extended to 27 or 33 ec.

Vakken:

Naam	Periode	Credits	Code
Minor Research Project MNS Medical Physics	Ac. Jaar (september)	21.0	X_432708
Minor Research Project MNS Medical Physics	Ac. Jaar (september)	27.0	X_432634
Minor Research Project MNS Medical Physics	Ac. Jaar (september)	33.0	X_432780
Minor Research Project MNS Medical Physiology	Ac. Jaar (september)	27.0	X_432713
Minor Research Project MNS Medical Physiology	Ac. Jaar (september)	21.0	X_432712
Minor Research Project MNS Medical Physiology	Ac. Jaar (september)	33.0	X_432782
Minor Research Project MNS Molecular Clinical Diagnostics	Ac. Jaar (september)	33.0	X_432781
Minor Research Project MNS Molecular Clinical Diagnostics	Ac. Jaar (september)	21.0	X_432710
Minor Research Project MNS Molecular Clinical Diagnostics	Ac. Jaar (september)	27.0	X_432711
Minor Research Project MNS Physics of Life	Ac. Jaar (september)	21.0	X_432709
Minor Research Project MNS Physics of Life	Ac. Jaar (september)	27.0	X_432717
Minor Research Project MNS Physics of Life	Ac. Jaar (september)	33.0	X_432783

Optional courses (18 ec compulsory)

Students need to select a total of 18 credits or more from the following list.

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

Vakken:

Naam	Periode	Credits	Code
Advanced Medical Technology	Periode 5	6.0	X_437026
Biomedical Optics	Periode 4	6.0	X_428529
Elektronica en signaalverwerking	Periode 4	6.0	X_420533
Physics of Organs 2: Sensory Organs and Bioelectricity	Semester 1	6.0	X_428528
Soft Condensed Matter and Biological Physics	Periode 2	6.0	X_420167

Colloquium / Literature thesis MNS

The minimum length of colloquium/literature study is 6 ec in Medical Physics. By using available free space this can be extended to 12 ec in Medical Physics. If 6 ec is chosen it is possible to choose an extra colloquium /literature study of 6 ec in any other track.

Opleidingsdelen:

- [Colloquium / Literature thesis \(1 out of 2\)](#)
- [Optional Colloquium Literature study \(free choice\)](#)

Colloquium / Literature thesis (1 out of 2)

Vakken:

Naam	Periode	Credits	Code
Colloquium / Literature thesis MNS - Medical Physics	Ac. Jaar (september)	6.0	X_432611
Colloquium / Literature thesis MNS - Medical Physics	Ac. Jaar (september)	12.0	X_432612

Optional Colloquium Literature study (free choice)

Vakken:

Naam	Periode	Credits	Code
Colloquium / Literature thesis MNS - Medical Physiology	Ac. Jaar (september)	6.0	X_432613
Colloquium / Literature thesis MNS - Molecular Clinical Diagnostics	Ac. Jaar (september)	6.0	X_432769
Colloquium / Literature thesis MNS - Physics of Life	Ac. Jaar (september)	6.0	X_432768

Selective elective Courses

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

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

Vakken:

Naam	Periode	Credits	Code
Differentiëren en integreren 3	Periode 4	3.0	X_400577
Introductie Medische Beeldbewerking	Periode 2	6.0	X_432630
Medical Imaging	Periode 5	6.0	X_428526
Voortgezette Biostatistiek	Periode 4	3.0	X_401078

Master Research Project MNS

The minimum length for the major project is 39 ects. By using available free space this can be extended to 45 or 51 ec.

Vakken:

Naam	Periode	Credits	Code
Major Research Project MNS Medical Physics	Ac. Jaar (september)	39.0	X_432593
Major Research Project MNS Medical Physics	Ac. Jaar (september)	45.0	X_432772
Major Research Project MNS Medical Physics	Ac. Jaar (september)	51.0	X_432773

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Biomedical Modelling and Simulation	Periode 1	6.0	X_430112
Parameter Estimation Applied to Medical and Biological Sciences	Periode 4	6.0	X_432631
Physics of Organs 1: Cardio-Pulmonary Physics	Periode 1	6.0	X_428527
Scientific Writing in English for Medical Natural Sciences	Periode 3	3.0	X_420563

Compulsory choice for all tracks

Compulsory choice Ethics for all tracks. Choose one of two.

Vakken:

Naam	Periode	Credits	Code
Ethics in Life Sciences	Periode 3	3.0	AM_470707

Research Variant Physics of Life

In addition to the courses below a total of 12 ects is available for optional courses. In case of deficiencies these courses are not optional but will be prescribed by the master coordinator.

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

Before starting the Major Research Project or the Minor Research Project at least half of the track specific courses have to be completed.

Master Coordinator:

Physics of Life
Master coordinator

Dr. S.M. Witte (VU)
K room T-036A
T +31 (0) 20 59 84039
E stefan.witte@vu.nl

Opleidingsdelen:

- [Minor Research Project MNS](#)
- [Optional courses \(12 ec compulsory\)](#)
- [Colloquium / Literature thesis MNS](#)
- [Optional Colloquium Literature study \(free choice\)](#)

- Aangeraden keuzevakken
- Master Research Project MNS
- Compulsory Courses PoL
- Compulsory choice for all tracks

Minor Research Project MNS

The minor project can be chosen in any track. The minimum length is 21 ec's. By using available free space this can be extended to 27 or 33 ec.

Vakken:

Naam	Periode	Credits	Code
Minor Research Project MNS Medical Physics	Ac. Jaar (september)	21.0	X_432708
Minor Research Project MNS Medical Physics	Ac. Jaar (september)	27.0	X_432634
Minor Research Project MNS Medical Physics	Ac. Jaar (september)	33.0	X_432780
Minor Research Project MNS Medical Physiology	Ac. Jaar (september)	27.0	X_432713
Minor Research Project MNS Medical Physiology	Ac. Jaar (september)	21.0	X_432712
Minor Research Project MNS Medical Physiology	Ac. Jaar (september)	33.0	X_432782
Minor Research Project MNS Molecular Clinical Diagnostics	Ac. Jaar (september)	33.0	X_432781
Minor Research Project MNS Molecular Clinical Diagnostics	Ac. Jaar (september)	21.0	X_432710
Minor Research Project MNS Molecular Clinical Diagnostics	Ac. Jaar (september)	27.0	X_432711
Minor Research Project MNS Physics of Life	Ac. Jaar (september)	21.0	X_432709
Minor Research Project MNS Physics of Life	Ac. Jaar (september)	27.0	X_432717
Minor Research Project MNS Physics of Life	Ac. Jaar (september)	33.0	X_432783

Optional courses (12 ec compulsory)

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

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

Vakken:

Naam	Periode	Credits	Code
Biomedical Optics	Periode 4	6.0	X_428529
Biophotonics III: Practical Training	Periode 3	3.0	AM_470630
Lasers and Quantum Optics	Periode 1	6.0	X_422539
Parameter Estimation Applied to Medical and Biological Sciences	Periode 4	6.0	X_432631
Statistical Theory of Complex Molecular Systems	Periode 1	6.0	X_428520

Colloquium / Literature thesis MNS

The minimum length of colloquium/literature study is 6 ec in Physics of Life. By using available free space this can be extended to 12 ec in Physics of Life. If 6 ec is chosen it is possible to choose an extra colloquium/literature study of 6 ec in any other track.

Vakken:

Naam	Periode	Credits	Code
Colloquium / Literature thesis MNS - Physics of Life	Ac. Jaar (september)	6.0	X_432768
Colloquium / Literature thesis MNS - Physics of Life	Ac. Jaar (september)	12.0	X_432770

Optional Colloquium Literature study (free choice)

Vakken:

Naam	Periode	Credits	Code
Colloquium / Literature thesis MNS - Medical Physics	Ac. Jaar (september)	6.0	X_432611
Colloquium / Literature thesis MNS - Medical Physiology	Ac. Jaar (september)	6.0	X_432613
Colloquium / Literature thesis MNS - Molecular Clinical Diagnostics	Ac. Jaar (september)	6.0	X_432769

Aangeraden keuzevakken

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

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

Vakken:

Naam	Periode	Credits	Code
Biophotonics I: Microspectroscopy	Periode 3	3.0	AM_470629
Differentiëren en integreren 3	Periode 4	3.0	X_400577
Introductie Medische Beeldbewerking	Periode 2	6.0	X_432630

Master Research Project MNS

The minimum length for the major project is 39 ects. By using available free space this can be extended to 45 or 51 ec.

Vakken:

Naam	Periode	Credits	Code
Major Research Project MNS Physics of Life	Ac. Jaar (september)	39.0	X_432716
Major Research Project MNS Physics of Life	Ac. Jaar (september)	45.0	X_432774
Major Research Project MNS Physics of Life	Ac. Jaar (september)	51.0	X_432775

Compulsory Courses PoL

Vakken:

Naam	Periode	Credits	Code
Biomedical Modelling and Simulation	Periode 1	6.0	X_430112
Dynamics of Biomolecules and Cells	Periode 4	6.0	X_422583
Major Research Project MNS Physics of Life	Ac. Jaar (september)	39.0	X_432716
Minor Research Project MNS Physics of Life	Ac. Jaar (september)	21.0	X_432709
Scientific Writing in English for Medical Natural Sciences	Periode 3	3.0	X_420563
Soft Condensed Matter and Biological Physics	Periode 2	6.0	X_420167

Compulsory choice for all tracks

Compulsory choice Ethics for all tracks. Choose one of two.

Vakken:

Naam	Periode	Credits	Code
Ethics in Life Sciences	Periode 3	3.0	AM_470707

Research Variant Molecular Clinical Diagnostics

In addition to the courses below a total of 12 ects is available for optional courses. In case of deficiencies these courses are not optional but will be prescribed by the master coordinator.

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

Before starting the Major Research Project or the Minor Research Project at least half of the track specific courses have to be completed.

Master Coordinator:

Dr. F. Ariese
K room T-036A
T +31 (0) 20 598 7524
E f.ariese@few.vu.nl

Opleidingsdelen:

- [Colloquium / Literature Thesis, 12 e](#)
- [Minor Research Project MNS](#)
- [Optional courses](#)
- [Colloquium / Literature thesis MNS](#)
- [Recommended Optional Courses](#)
- [Master Research Project MNS](#)
- [Compulsory Courses](#)
- [Compulsory choice for all tracks](#)

Colloquium / Literature Thesis, 12 e

Compulsory choice: 1 out of 6

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
Colloquium / Literature thesis Medical Natural Sciences - Analytische Chemie en Toegepaste Spectroscopie	Ac. Jaar (september)	12.0	X_432606

Colloquium / Literature thesis Medical Natural Sciences - Biofysica	Ac. Jaar (september)	12.0	X_432608
Colloquium / Literature thesis Medical Natural Sciences - Fysica van complexe systemen	Ac. Jaar (september)	12.0	X_432610
Colloquium / Literature thesis Medical Natural Sciences - Vumc-klinische chemie	Ac. Jaar (september)	12.0	X_432604
Colloquium / Literature thesis MNS - Medical Physics	Ac. Jaar (september)	12.0	X_432612
Colloquium / Literature thesis MNS - Medical Physiology	Ac. Jaar (september)	12.0	X_432614

Minor Research Project MNS

The minor project can be chosen in any track. The minimum length is 21 ec's. By using available free space this can be extended to 27 or 33 ec.

Vakken:

Naam	Periode	Credits	Code
Minor Research Project MNS Medical Physics	Ac. Jaar (september)	21.0	X_432708
Minor Research Project MNS Medical Physics	Ac. Jaar (september)	27.0	X_432634
Minor Research Project MNS Medical Physics	Ac. Jaar (september)	33.0	X_432780
Minor Research Project MNS Medical Physiology	Ac. Jaar (september)	27.0	X_432713
Minor Research Project MNS Medical Physiology	Ac. Jaar (september)	21.0	X_432712
Minor Research Project MNS Medical Physiology	Ac. Jaar (september)	33.0	X_432782
Minor Research Project MNS Molecular Clinical Diagnostics	Ac. Jaar (september)	33.0	X_432781
Minor Research Project MNS Molecular Clinical Diagnostics	Ac. Jaar (september)	21.0	X_432710
Minor Research Project MNS Molecular Clinical Diagnostics	Ac. Jaar (september)	27.0	X_432711
Minor Research Project MNS Physics of Life	Ac. Jaar (september)	21.0	X_432709
Minor Research Project MNS Physics of Life	Ac. Jaar (september)	27.0	X_432717

Minor Research Project MNS Physics of Life	Ac. Jaar (september)	33.0	X_432783
--	----------------------	------	----------

Optional courses

Compulsory choice of at least 12 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
Advanced Spectroscopy	Periode 6	6.0	X_432767
Drug-induced Stress and Cellular Responses	Periode 2	6.0	X_432536
Pathophysiology of Heart and Circulation	Periode 1	6.0	M_CPATHO09
Signal Transduction in Health and Disease	Periode 2	6.0	X_432535

Colloquium / Literature thesis MNS

A colloquium/literature study of 6 ec or 12 ec in Molecular Clinical Diagnostics is compulsory. If 6 ec is chosen an extra colloquium /literature study of 6 ec in any other track is required.

Opleidingsdelen:

- [Colloquium / Literature thesis \(1 out of 2\)](#)
- [Compulsory choice Colloquium / Literature study \(extension to 12 ec\)](#)

Colloquium / Literature thesis (1 out of 2)

Vakken:

Naam	Periode	Credits	Code
Colloquium / Literature thesis MNS - Molecular Clinical Diagnostics	Ac. Jaar (september)	6.0	X_432769
Colloquium / Literature thesis MNS - Molecular Clinical Diagnostics	Ac. Jaar (september)	12.0	X_432771

Compulsory choice Colloquium / Literature study (extension to 12 ec)

Only compulsory if a 6 ec Colloquium / Literature study is chosen in Molecular Clinical Diagnostics

Vakken:

Naam	Periode	Credits	Code
Colloquium / Literature thesis MNS - Medical Physics	Ac. Jaar (september)	6.0	X_432611
Colloquium / Literature thesis MNS - Medical Physiology	Ac. Jaar (september)	6.0	X_432613
Colloquium / Literature thesis MNS - Physics of Life	Ac. Jaar (september)	6.0	X_432768

Recommended Optional Courses

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

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

Vakken:

Naam	Periode	Credits	Code
Inleiding bioinformatica 2	Periode 4	3.0	X_401042
Voortgezette Biostatistiek	Periode 4	3.0	X_401078

Master Research Project MNS

The minimum length for the major project is 39 ects. By using available free space this can be extended to 45 or 51 ec.

Vakken:

Naam	Periode	Credits	Code
MNS Major Research Project Molecular Clinical Diagnostics	Ac. Jaar (september)	51.0	X_432777
MNS Major Research Project Molecular Clinical Diagnostics	Ac. Jaar (september)	39.0	X_432715
MNS Major Research Project Molecular Clinical Diagnostics	Ac. Jaar (september)	45.0	X_432776

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Bio-analysis & Clinical Diagnostics	Periode 1	6.0	X_432765
Minor Research Project MNS Molecular Clinical Diagnostics	Ac. Jaar (september)	21.0	X_432710
MNS Major Research Project Molecular Clinical Diagnostics	Ac. Jaar (september)	39.0	X_432715
Omics-procedures in molecular clinical Diagnostics	Periode 5	6.0	X_432766
Scientific Writing in English for Medical Natural Sciences	Periode 3	3.0	X_420563

Compulsory choice for all tracks

Compulsory choice Ethics for all tracks. Choose one of two.

Vakken:

Naam	Periode	Credits	Code
Ethics in Life Sciences	Periode 3	3.0	AM_470707

Research Variant Medical Physiology

Opleidingsdelen:

- [Minor Research Project MNS](#)
- [Optional courses \(18 ec compulsory\)](#)
- [Colloquium / Literature thesis MNS](#)
- [Deficientievakken](#)
- [Master Research Project MNS](#)
- [Compulsory Courses](#)
- [Compulsory choice for all tracks](#)

Minor Research Project MNS

The minor project can be chosen in any track. The minimum length is 21 ects. By using available free space this can be extended to 27 or 33 ec.

Vakken:

Naam	Periode	Credits	Code
Minor Research Project MNS Medical Physics	Ac. Jaar (september)	21.0	X_432708

Minor Research Project MNS Medical Physics	Ac. Jaar (september)	27.0	X_432634
Minor Research Project MNS Medical Physics	Ac. Jaar (september)	33.0	X_432780
Minor Research Project MNS Medical Physiology	Ac. Jaar (september)	27.0	X_432713
Minor Research Project MNS Medical Physiology	Ac. Jaar (september)	21.0	X_432712
Minor Research Project MNS Medical Physiology	Ac. Jaar (september)	33.0	X_432782
Minor Research Project MNS Molecular Clinical Diagnostics	Ac. Jaar (september)	33.0	X_432781
Minor Research Project MNS Molecular Clinical Diagnostics	Ac. Jaar (september)	21.0	X_432710
Minor Research Project MNS Molecular Clinical Diagnostics	Ac. Jaar (september)	27.0	X_432711
Minor Research Project MNS Physics of Life	Ac. Jaar (september)	21.0	X_432709
Minor Research Project MNS Physics of Life	Ac. Jaar (september)	27.0	X_432717
Minor Research Project MNS Physics of Life	Ac. Jaar (september)	33.0	X_432783

Optional courses (18 ec compulsory)

Compulsory choice of at least 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
Bio-analysis & Clinical Diagnostics	Periode 1	6.0	X_432765
Drug-induced Stress and Cellular Responses	Periode 2	6.0	X_432536
Signal Transduction in Health and Disease	Periode 2	6.0	X_432535

Colloquium / Literature thesis MNS

A colloquium/literature study of 6 ec or 12 ec in Medical Physiology is compulsory. If 6 ec is chosen an extra colloquium /literature study of 6 ec in any other track is required.

Opleidingsdelen:

- Colloquium / Literature thesis (1 out of 2)
- Compulsory choice Colloquium / Literature study (extension to 12 ec)

Colloquium / Literature thesis (1 out of 2)

Vakken:

Naam	Periode	Credits	Code
Colloquium / Literature thesis MNS - Medical Physiology	Ac. Jaar (september)	6.0	X_432613
Colloquium / Literature thesis MNS - Medical Physiology	Ac. Jaar (september)	12.0	X_432614

Compulsory choice Colloquium / Literature study (extension to 12 ec)

Only compulsory if a 6 ec Colloquium / Literature study is chosen in Medical Physiology

Vakken:

Naam	Periode	Credits	Code
Colloquium / Literature thesis MNS - Medical Physics	Ac. Jaar (september)	6.0	X_432611
Colloquium / Literature thesis MNS - Molecular Clinical Diagnostics	Ac. Jaar (september)	6.0	X_432769
Colloquium / Literature thesis MNS - Physics of Life	Ac. Jaar (september)	6.0	X_432768

Deficientievakken

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

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

Vakken:

Naam	Periode	Credits	Code
Inleiding bioinformatica 2	Periode 4	3.0	X_401042
Voortgezette Biostatistiek	Periode 4	3.0	X_401078

Master Research Project MNS

The minimum length for the major project is 39 ects. By using available free space this can be extended to 45 or 51 ec.

Vakken:

Naam	Periode	Credits	Code
Major Research Project MNS Medical Physiology	Ac. Jaar (september)	39.0	X_432714
Major Research Project MNS Medical Physiology	Ac. Jaar (september)	45.0	X_432778
Major Research Project MNS Medical Physiology	Ac. Jaar (september)	51.0	X_432779

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Advanced Cardiac Diagnostics	Periode 3+4+5	3.0	M_CCARDIA09
Biomedical Modelling and Simulation	Periode 1	6.0	X_430112
Pathophysiology of Heart and Circulation	Periode 1	6.0	M_CPATHO09
Scientific Writing in English for Medical Natural Sciences	Periode 3	3.0	X_420563

Compulsory choice for all tracks

Compulsory choice Ethics for all tracks. Choose one of two.

Vakken:

Naam	Periode	Credits	Code
Ethics in Life Sciences	Periode 3	3.0	AM_470707

Society Oriented Variant for Medical Natural Sciences

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

Opleidingsdelen:

- [Courses for Society Oriented Part](#)
- [MNS courses for C-E-M variant](#)

Courses for Society Oriented Part

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

Opleidingsdelen:

- [MSc Biology, Societal specialisation](#)

MSc Biology, Societal specialisation

Courses:

Name	Period	Credits	Code
Analysis of Governmental Policy	Period 1	6.0	AM_470571
Business Management in Health and Life Sciences	Period 2	6.0	AM_470584
Clinical development and clinical trials	Period 3	6.0	AM_470585
Communication, Organization and Management	Period 2	6.0	AM_470572
Disability and Development	Period 2	6.0	AM_470588
Entrepreneurship in Health and Life Sciences	Period 2	6.0	AM_470575
Health, Globalisation and Human Rights	Period 2	6.0	AM_470818
Internship Societal Specialisation	Ac. Year (September)	30.0	AM_471147
Policy, Politics and Participation	Period 2	6.0	AM_470589
Qualitative and Quantitative Research Methods	Period 1	6.0	AM_470582
Science in Dialogue	Period 2	6.0	AM_1002

MNS courses for C-E-M variant

MNS courses for C-variant. 60 ec of MNS courses from the specialization has to be chosen in consultation with the master coordinator.

Opleidingsdelen:

- [Courses in track Molecular Clinical Diagnostics \(C, E or M-variant\)](#)
- [Courses in track Medical Physics \(C, E or M-variant\)](#)
- [Courses in track Medical Physiology \(C, E or M-variant\)](#)
- [Courses in track Physics of Life \(C, E or M-variant\)](#)

- Compulsory choice for all tracks

Courses in track Molecular Clinical Diagnostics (C, E or M-variant)

Opleidingsdelen:

- Compulsory choice (18 ec track specific)
- Compulsory Courses

Compulsory choice (18 ec track specific)

Vakken:

Naam	Periode	Credits	Code
Advanced Spectroscopy	Periode 6	6.0	X_432767
Bio-analysis & Clinical Diagnostics	Periode 1	6.0	X_432765
Drug-induced Stress and Cellular Responses	Periode 2	6.0	X_432536
Omics-procedures in molecular clinical Diagnostics	Periode 5	6.0	X_432766
Pathophysiology of Heart and Circulation	Periode 1	6.0	M_CPATHO09
Signal Transduction in Health and Disease	Periode 2	6.0	X_432535

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Colloquium / Literature thesis MNS - Molecular Clinical Diagnostics	Ac. Jaar (september)	6.0	X_432769
Master Project Molecular Clinical Diagnostics (for M,C,E-variant)	Ac. Jaar (september)	30.0	X_432628
Scientific Writing in English for Medical Natural Sciences	Periode 3	3.0	X_420563

Courses in track Medical Physics (C, E or M-variant)

Opleidingsdelen:

- Compulsory choice (18 ec track specific)
- Compulsory Courses

Compulsory choice (18 ec track specific)

Vakken:

Naam	Periode	Credits	Code
Advanced Medical Technology	Periode 5	6.0	X_437026
Biomedical Modelling and Simulation	Periode 1	6.0	X_430112
Biomedical Optics	Periode 4	6.0	X_428529
Parameter Estimation Applied to Medical and Biological Sciences	Periode 4	6.0	X_432631
Physics of Organs 1: Cardio-Pulmonary Physics	Periode 1	6.0	X_428527
Physics of Organs 2: Sensory Organs and Bioelectricity	Semester 1	6.0	X_428528
Soft Condensed Matter and Biological Physics	Periode 2	6.0	X_420167

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Colloquium / Literature thesis MNS - Medical Physics	Ac. Jaar (september)	6.0	X_432611
Master Project Medical Physics (M,C,E-var.)	Ac. Jaar (september)	30.0	X_432627
Scientific Writing in English for Medical Natural Sciences	Periode 3	3.0	X_420563

Courses in track Medical Physiology (C, E or M-variant)

Opleidingsdelen:

- Compulsory choice (18 ec track specific)
- Compulsory courses

Compulsory choice (18 ec track specific)

Vakken:

Naam	Periode	Credits	Code
Advanced Cardiac Diagnostics	Periode 3+4+5	3.0	M_CCARDIA09
Bio-analysis & Clinical Diagnostics	Periode 1	6.0	X_432765
Biomedical Modelling and Simulation	Periode 1	6.0	X_430112
Drug-induced Stress and Cellular Responses	Periode 2	6.0	X_432536
Pathophysiology of Heart and Circulation	Periode 1	6.0	M_CPATHO09
Signal Transduction in Health and Disease	Periode 2	6.0	X_432535

Compulsory courses

Vakken:

Naam	Periode	Credits	Code
Colloquium / Literature thesis MNS - Medical Physiology	Ac. Jaar (september)	6.0	X_432613
Master Project Medical Physiology (M,C,E-var.)	Ac. Jaar (september)	30.0	X_432626
Scientific Writing in English for Medical Natural Sciences	Periode 3	3.0	X_420563

Courses in track Physics of Life (C, E or M-variant)

Opleidingsdelen:

- [Compulsary choice \(18 ec track specific\)](#)
- [Compulsory Courses](#)

Compulsary choice (18 ec track specific)

Vakken:

Naam	Periode	Credits	Code
Biomedical Modelling and Simulation	Periode 1	6.0	X_430112

Biomedical Optics	Periode 4	6.0	X_428529
Biophotonics III: Practical Training	Periode 3	3.0	AM_470630
Dynamics of Biomolecules and Cells	Periode 4	6.0	X_422583
Lasers and Quantum Optics	Periode 1	6.0	X_422539
Parameter Estimation Applied to Medical and Biological Sciences	Periode 4	6.0	X_432631
Soft Condensed Matter and Biological Physics	Periode 2	6.0	X_420167
Statistical Theory of Complex Molecular Systems	Periode 1	6.0	X_428520

Compulsory Courses

Vakken:

Naam	Periode	Credits	Code
Colloquium / Literature thesis MNS - Physics of Life	Ac. Jaar (september)	6.0	X_432768
Master Project Physics of Life (M,C,E-var.)	Ac. Jaar (september)	30.0	X_432629
Scientific Writing in English for Medical Natural Sciences	Periode 3	3.0	X_420563

Compulsory choice for all tracks

Compulsory choice Ethics for all tracks. Choose one of two.

Vakken:

Naam	Periode	Credits	Code
Ethics in Life Sciences	Periode 3	3.0	AM_470707

Advanced Cardiac Diagnostics

Vakcode	M_CCARDIA09 (3120004)
Periode	Periode 3+4+5
Credits	3.0
Voertaal	Engels
Faculteit	VUmc
Coördinator	dr. O. Kamp
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Doel vak

This course focuses on an update in different cardiac image modalities to quantify myocardial perfusion and myocardial function in coronary artery disease and cardiomyopathy.

Inhoud vak

- MRI, PET/CT, Intracoronary FFR/CFR
- Echocardiography diagnostic and therapeutic
- Cardiac Resynchronisation Therapy and Two Stage procedure
- Literature study

Toetsvorm

Written exam. In addition, students will receive their credits only when they have participated in the classes and also have fulfilled all requirements.

Literatuur

Syllabus including relevant articles.

Intekenprocedure

Students can register for this course and examinations via vunet.vu.nl (under My study, register for courses and exams). The general VU registration rules apply. Information on registration deadlines can be found in VUnet. Please note that the general VU rules are strict, both for booking of the classes and (resit-)exams.

Advanced Medical Technology

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

Doel vak

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

Inhoud vak

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

Onderwijsvorm

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

presentations.

Overige informatie

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

Advanced Spectroscopy

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

Doel vak

To acquire a deeper insight into the basic principles and modern developments of molecular spectroscopy in (bio)analytical chemistry, with emphasis on fluorescence/luminescence and Raman techniques. To become familiar with recent literature on the use of these techniques in a variety of applications. To acquire practical skills in modern (laser) spectroscopy.

Inhoud vak

The topics discussed comprise the basic principles of fluorescence/phosphorescence and Raman spectroscopy. Attention will be given to energy transfer mechanisms and the use of fluorescent probes, high-resolution fluorescence at cryogenic temperatures, single-molecule spectroscopy and coupling to analytical separation techniques. Raman spectroscopic topics will include surface-enhanced Raman, resonance Raman, time-resolved Raman and non-linear Raman techniques. Instrumental aspects, such as laser excitation, time-resolved detection, polarization and imaging will also be covered in this course. Recent examples of the use of these techniques in a chemistry, medical, environmental, industrial, forensic or space research context will be discussed on the basis of literature presentations by the students. The course also includes a set of fluorescence and Raman experiments at VU LaserLaB

Onderwijsvorm

Lectures, tutorials

In small groups the students will carry out a set of experiments, of which the results will be laid down in a report and an oral presentation.

The students will also prepare a presentation on a recent literature article, to be given and discussed in class.

Toetsvorm

The final grade will be determined based on

Experiment report (1/6)

Experiment presentation (1/6)

Literature presentation (1/6)

Written exam (3/6)

Literatuur

Handouts and literature articles will be provided by the lecturer

Aanbevolen voorkennis

Background knowledge of molecular spectroscopic techniques, in particular fluorescence and Raman, is expected (for instance MSc Chem course (bio)molecular spectroscopy or 3MNW/2N course Microscopy and Spectroscopy). When in doubt please contact the lecturer.

Doelgroep

MSc Chemistry, MSc Medical Natural Sciences

Algemene didactiek en Pedagogiek I

Vakcode	O_MLADEPI ()
Periode	Semester 1, Semester 2
Credits	6.0
Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek
Coördinator	ir. E.J.F. Scheringa
Docent(en)	drs. W.S. Hoekstra, drs. S. Donszelmann, drs. B. Klein, drs. W. Jongejan, C.L. Geraedts
Lesmethode(n)	Hoorcollege
Niveau	500

Doel vak

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

Inhoud vak

Deze module kent 4 onderdelen:

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

Onderwijsvorm

Colleges (hoorcolleges en werkgroepen)

Toetsvorm

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

Literatuur

Een literatuurlijst wordt verstrekt aan het begin van de opleiding

Vereiste voorkennis

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

Overige informatie

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

Algemene Didactiek en Pedagogiek II

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

Doel vak

De student kan:

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

Inhoud vak

Deze module kent 2 onderdelen:

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

Onderwijsvorm

Colleges (hoorcolleges en werkgroepen) en zelfstudie

Toetsvorm

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

Literatuur

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

Vereiste voorkennis

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

Overige informatie

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

Analysis of Governmental Policy

Vakcode	AM_470571 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	prof. dr. J.T. de Cock Buning
Docent(en)	prof. dr. J.T. de Cock Buning
Lesmethode(n)	Hoorcollege, Werkgroep, Computerpracticum
Niveau	500

Doel vak

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

Inhoud vak

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

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

Onderwijsvorm

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

The different elements have the following study time:

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

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

Toetsvorm

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

Literatuur

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

Aanbevolen voorkennis

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

Doelgroep

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

Overige informatie

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

Bio-analysis & Clinical Diagnostics

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

Doel vak

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
Docent(en)	dr. I.H.M. van Stokkum, prof. dr. G.J.M. Stienen, dr. ir. T.J.C. Faes, dr. J.C. de Munck
Lesmethode(n)	Hoorcollege, Werkcollege, Practicum, Werkgroep
Niveau	400

Doel vak

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

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

Inhoud vak

This course will start with a general overview the various types of models used to describe biomedical processes by parametric and non-parametric models using linear and non linear (differential)

equations. Basic knowledge of vector and matrix calculations and differential equations is required but will be refreshed.

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

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

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

Onderwijsvorm

Lectures, working groups, assignments.

Toetsvorm

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

Literatuur

Syllabus.

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

Doelgroep

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

Biomedical Optics

Vakcode	X_428529 (428529)
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

The course description is; available on <http://studiegids.uva.nl/web/uva/sgs/en/c/10865.html>

Overige informatie

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

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

Biophotonics I: Microspectroscopy

Vakcode	AM_470629 ()
Periode	Periode 3
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. ir. Y.J.M. Bollen
Docent(en)	prof. dr. ir. E.J.G. Peterman, dr. ir. Y.J.M. Bollen
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak

To introduce students into various spectroscopic and microscopic techniques.

Students should know the theoretical principles and the applicability in life sciences of:

- absorption spectroscopy
- fluorescence spectroscopy
- light microscopy
- fluorescence microscopy

Inhoud vak

Optical spectroscopy and microscopy are widely used in cell biology and biophysics. In this course the principles of many of these techniques, including absorption spectroscopy, various types of fluorescence spectroscopy (e. g. polarization, FRET) and fluorescence microscopy (e. g. confocal, TIRF, lifetime imaging) are explained. Their application in modern biophysics and cell biology research is illustrated by a number of (guest) lecturers.

Onderwijsvorm

Lectures (28 hours), group assignment (8 hours), self-study

Toetsvorm

Written exam (75%), oral presentation by group (25%)

Literatuur

Notes, handouts and papers

Doelgroep

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

Overige informatie

Due to largely overlapping contents this course is NOT intended for students who have taken the FEW BSc course "Microscopische beeldvorming (X_420529)".

Practical training in the techniques discussed here is offered in Biophotonics 3, for which Biophotonics 1 is required.

Biophotonics III: Practical Training

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

Doel vak

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

Students should be able to:

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

Inhoud vak

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

Onderwijsvorm

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

Toetsvorm

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

Literatuur

Reader (5 euro)

Papers and protocols that will be made available through Blackboard

Vereiste voorkennis

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

Doelgroep

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

Overige informatie

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

Business Management in Health and Life Sciences

Vakcode	AM_470584 ()
----------------	--------------

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

Doel vak

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

To get acquainted with:

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

To acquire insight in Human Resource Management models

To get acquainted with different models of financing

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

Inhoud vak

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

Onderwijsvorm

Lectures:35h

Assignment: 4h

Work on assignment (self study): 40h

Preparing the exam: 81h

Toetsvorm

Written exam: 50%

Personal Business Plan: 50%

Both have to be passed

Literatuur

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

Doelgroep

Optional course for Master students Management, Policy Analysis and Entrepreneurship in Health and Life Sciences (MPA), Societal

differentiation of the Health, Life & Natural Sciences.

Overige informatie

Guest lecturers/organisations:

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

Clinical development and clinical trials

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

Doel vak

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

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

To acquire knowledge and insight into clinical study methodology

To acquire knowledge and skills into the regulatory principles

To acquire knowledge of ICH-GCP and quality

To acquire knowledge and insight into clinical trial coordination

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

To acquire insight into the ethical aspects

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

To learn to design a clinical study

To acquire insight into the different epidemiologic study designs

To acquire knowledge and skills into how exposure and disease in a population can be measured and how the relationships between them can be assessed (using SPSS)

To acquire knowledge and skills into interpreting and presenting the results of an epidemiologic study

Inhoud vak

The need for rigorous evaluation of components of health care is increasingly recognised worldwide. An important type of evaluation is

the clinical trial. The most commonly performed clinical trials evaluate new drugs, medical devices, biologics, or other interventions on patients in strictly scientifically controlled settings, and are required for regulatory authority approval of new therapies. This course aims to provide students with a theoretical and practical understanding of the issues involved in the design, conduct, analysis and interpretation of clinical trials of health interventions. Furthermore classes are provided on which the actual use of clinical trials in day to day R&D strategies within industry and universities is addressed in detail. Classes include: 'Life Cycle of a Clinical Trial', 'Clinical Trial Methodology', 'ICH-GCP Principles', 'The Ethics Committee', 'Safety Considerations in Clinical Trials', 'Quality Control & Quality Assurance', 'Compliance, Misconduct & Fraud'.

An additional week of basic epidemiology will help you to complement the knowledge obtained so far in the course with an understanding of the principles of other types of study designs (cross-sectional, longitudinal, case-control). Issues concerning exposure and disease measurement and exposure-disease relationships will be discussed in detail, and examples will be provided. Together with your colleagues, you will learn how to apply this knowledge first by hand (during the lectures), then to an epidemiologic database (during the computer-based sessions) and how to interpret the results critically.

Onderwijsvorm

Lectures: 25h

(Computer) workgroup: 32h

Preparing the exam: 2h

Toetsvorm

Written exam: 100%

Literatuur

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

Doelgroep

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

Overige informatie

Guest lecturers/organisations:

- Eric Klaver
- DOCS
- Others to be announced

Colloquium / Literature thesis Medical Natural Sciences - Analytische Chemie en Toegepaste Spectroscopie

Vakcode	X_432606 (432606)
Periode	Ac. Jaar (september)
Credits	12.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H. Lingeman
Niveau	600

Colloquium / Literature thesis Medical Natural Sciences - Biofysica

Vakcode	X_432608 (432608)
Periode	Ac. Jaar (september)
Credits	12.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	600

Colloquium / Literature thesis Medical Natural Sciences - Fysica van complexe systemen

Vakcode	X_432610 (432610)
Periode	Ac. Jaar (september)
Credits	12.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	600

Colloquium / Literature thesis Medical Natural Sciences - Vumc-klinische chemie

Vakcode	X_432604 (432604)
Periode	Ac. Jaar (september)
Credits	12.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. ir. T.J.C. Faes
Niveau	600

Colloquium / Literature thesis MNS - Medical Physics

Vakcode	X_432611 (432611)
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. ir. T.J.C. Faes
Niveau	600

Colloquium / Literature thesis MNS - Medical Physics

Vakcode	X_432612 (432612)
Periode	Ac. Jaar (september)

Credits	12.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. ir. T.J.C. Faes
Niveau	600

Colloquium / Literature thesis MNS - Medical Physiology

Vakcode	X_432613 (432613)
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. G.J.M. Stienen
Niveau	600

Colloquium / Literature thesis MNS - Medical Physiology

Vakcode	X_432614 (432614)
Periode	Ac. Jaar (september)
Credits	12.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. G.J.M. Stienen
Niveau	600

Colloquium / Literature thesis MNS - Molecular Clinical Diagnostics

Vakcode	X_432769 ()
Periode	Ac. Jaar (september)
Credits	6.0
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H. Lingeman
Niveau	600

Doel vak

Literature study on a topic related to the molecular clinical diagnostics.

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

mMNS

Colloquium / Literature thesis MNS - Molecular Clinical Diagnostics

Vakcode	X_432771 ()
Periode	Ac. Jaar (september)
Credits	12.0
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H. Lingeman
Niveau	600

Doel vak

Literature study on a topic related to the molecular clinical diagnostics.

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

mMNS

Colloquium / Literature thesis MNS - Physics of Life

Vakcode	X_432768 ()
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. S.M. Witte
Niveau	600

Colloquium / Literature thesis MNS - Physics of Life

Vakcode	X_432770 ()
Periode	Ac. Jaar (september)
Credits	12.0
Voertaal	Nederlands
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. S.M. Witte

Niveau	600
---------------	-----

Communication, Organization and Management

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

Doel vak

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

Inhoud vak

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

Onderwijsvorm

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

Toetsvorm

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

Literatuur

To be announced on Blackboard

Doelgroep

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

Overige informatie

Attendance to training, workshops, interviews and discussions is indispensable

Differentiëren en integreren 3

Vakcode	X_400577 (400577)
Periode	Periode 4
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. M.T. Joosten
Examinator	dr. M.T. Joosten
Docent(en)	dr. M.T. Joosten
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	200

Doel vak

Kunnen toepassen van basale calculustechnieken in vraagstukken.
Vertalen van een eenvoudige praktijkbeschrijving naar een calculusopgave.
Zelfstandig bestuderen van wiskundetekst in de Engelse taal.

Inhoud vak

Dubbele en herhaalde integralen, vectorvelden, lijn- en oppervlak-integralen van functies en vectorvelden, de stellingen van Green, Gauss en Stokes.

Onderwijsvorm

Hoor- en werkcollege.

Toetsvorm

Schriftelijk tentamen en eventueel inleveropgaven.

Literatuur

Adams, R.A. en Essex, C., Calculus: a Complete Course, 8th Edition. Pearson 2013.

Doelgroep

1W, 1N, 1WN, 3MNW.

Disability and Development

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

Doel vak

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

Inhoud vak

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

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

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

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

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

Onderwijsvorm

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

The programme comprises 168 study hours, divided as follows:

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

Toetsvorm

Participation in tutorial groups: 10%

Take-home examination, submitted electronically: 60%

Scientific article: 30%

Literatuur

See e-reader

Vereiste voorkennis

Bachelor-level education; any subject

Doelgroep

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

Overige informatie

Jacqueline Kool, MA

Lydia la Rivière-Zijdel, MA

Drug-induced Stress and Cellular Responses

Vakcode	X_432536 (432536)
Periode	Periode 2

Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. J.N.M. Commandeur
Docent(en)	dr. J.N.M. Commandeur
Lesmethode(n)	Hoorcollege
Niveau	500

Doel vak

At the end of this theoretical course, the students are aware of the latest insights of cellular stress responses which can occur after exposure of cells to reactive drugs and/or reactive drug metabolites.

Inhoud vak

Exposure of tissues to high levels of drugs and/or drug metabolites in some cases can trigger various biochemical responses. Interaction with sensor proteins can lead to adaptative stress responses which will protect the cell against further damage. If these adaptative stress responses are insufficient, interaction with critical proteins may lead to cell death or exaggerated, fatal pharmacological responses. The following aspects will be studied in the course drug-induced stress and cellular signaling:

- (types of) adverse drug reactions
- role of biotransformation and drug transport in adverse drug reactions,
- reversible and irreversible interactions of toxic drugs with biological macromolecules,
- cellular adaptation to exposure to reactive intermediates and reactive oxygen species;
- cellular and molecular mechanisms leading to toxic effects,
- genetic toxicology and chemical carcinogenesis,
- role of mitochondria in necrosis and apoptosis,
- impairment of cell proliferation and tissue repair,
- immune-mediated toxicity.

Onderwijsvorm

Lectures and self study.

Toetsvorm

Written exam

Literatuur

Boelsterli, Mechanistic Toxicology: The Molecular Basis of How Chemicals Disrupt Biological Targets 2nd ed, CRC Press, 2007 (ISBN 0849372720).

Vereiste voorkennis

Bachelor Physics, Chemistry, Mathematics, Biology, Medical Biology
Pharmaceutical Sciences, Medical Natural Science Biomolecular Science
portal course, or equivalent

Doelgroep

mDDS, mBMS

Dynamics of Biomolecules and Cells

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

Doel vak

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

Inhoud vak

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

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

Onderwijsvorm

Hoorcolleges, literatuur essay, mondelinge presentatie literatuur

Toetsvorm

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

Literatuur

Notes, handouts and papers.

Vereiste voorkennis

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

Doelgroep

mMNS-PoL, mPhys-LSBP, mPhys-PLH

Elektronica en signaalverwerking

Vakcode	X_420533 (420533)
Periode	Periode 4
Credits	6.0

Voertaal	Nederlands
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	drs. ing. J.M. Mulder
Docent(en)	drs. ing. J.M. Mulder
Lesmethode(n)	Practicum
Niveau	300

Doel vak

Het doel van het "Elektronica en Signaalverwerking" practicum is het bekend worden met verschillende relevante meet-, regel- en signaalverwerkingstechnieken, die in de experimentele onderzoeksgroepen gebruikt worden. Technieken zoals lock-in versterker, PID regelsystemen en verschillende filters, waarbij zowel naar hardwarematige als softwarematige oplossingen gekeken wordt. Voor het begrijpen, ontwerpen en onderzoeken van deze technieken is kennis nodig in de basisbegrippen van de elektronica, die in het begin van de cursus behandeld worden. In de cursus worden ook vaardigheden geleerd in probleemoplossende en -voorkomende methoden in complexe elektronische schakelingen (meetsystemen).

Inhoud vak

In het college zullen de volgende onderwerpen aan de orde komen:

De basisprincipes en analysetechnieken in gelijk- en wisselstroom circuits;
 netwerken en vervangingsschema's
 complexe overdrachtsfuncties en bodeplots
 van verschillende filters en resonantiecircuiten.
 Diodeschakelingen;
 enkel- en dubbelfasige gelijkrichting.
 Operationele versterkerschakelingen en circuits met negatieve terugkoppeling;
 Niet inverterende versterkers
 Bufferversterkers
 Som- en verschilversterkers
 Instrumentatieversterker
 Integrator
 Differentiator
 Actieve filters; het Butterworth filter.
 Digitale logica;
 Adder (half en full)
 Multiplexer en demultiplexer
 Regelsystemen;
 Een analoge P-regelaar.
 Een digitale PID-regelaar.
 Modulatie en demodulatie technieken;
 Amplitude (de)modulatie
 Synchrone detector; Onderzoeken van een Lock-in detector

Onderwijsvorm

Geïntegreerd college en practicum.

Toetsvorm

De beoordeling vindt plaats op grond van de resultaten van schriftelijke toetsen, het vertoonde inzicht en de experimentele vaardigheid tijdens de uitvoering van de experimenten, en het bijgehouden waarnemingenboek.

Literatuur

Practicumhandleiding en aanvullende informatie.

Doelgroep

3N, 3WN en mMNS-MPs (verplicht voor aantekening NVKF)

Entrepreneurship in Health and Life Sciences

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

Doel vak

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

Learning objectives

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

Inhoud vak

This course consists of two tracks: a theoretical track and a practical track. These two tracks run simultaneously. In the first track you learn about entrepreneurship. Answers are found on questions such as: What is entrepreneurship? What defines an entrepreneur? What are entrepreneurial opportunities? What is the role of innovation in entrepreneurship? What is corporate social responsibility (CSR)? How can we judge the feasibility of entrepreneurial ambitions? Simultaneously you work on an assignment (second track). In the first week of this course you search for an innovation in your own discipline (product, service, process

etc). Your choice must be approved by the lecturers. The first part of the assignment consists of a description of the innovation which you have chosen. Subsequently, you make a SWOT-analysis and a network analysis of the innovation. Also a paragraph on CSR aspect should be added. The final part of the assignment is your own feasibility study: how would you valorize the innovation to the market?

Onderwijsvorm

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

Schedule and study time

The total study time is 160 hours.

Tuition methods include lectures, consultancies and self-study.

The different elements have the following study time:

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

Toetsvorm

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

Literatuur

To be announced on Blackboard

Doelgroep

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

Overige informatie

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

anna.van.luijn@falw.vu.nl

Ethics in Life Sciences

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

Doel vak

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

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

Inhoud vak

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

Onderwijsvorm

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

The total study time is 80 hours.

The different elements have the following study time:

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

Please note that attendance to the work group meetings is compulsory.

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

Toetsvorm

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

Literatuur

Available on Blackboard

Vereiste voorkennis

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

Doelgroep

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

Overige informatie

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

compulsory.

Health, Globalisation and Human Rights

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

Doel vak

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

Inhoud vak

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

Onderwijsvorm

Contact hours

Lectures: 33 hours

Work groups: 10 hours

Group project, simulation and exam: 8 hours

Self study and preparing: remaining hours

Toetsvorm

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

Literatuur

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

Doelgroep

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

Overige informatie

Guest lectures and guest organisations (under reservation):

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

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

Inleiding bioinformatica 2

Vakcode	X_401042 (401042)
Periode	Periode 4
Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. F.J. Bruggeman
Docent(en)	prof. dr. B. Teusink, prof. dr. F.J. Bruggeman
Lesmethode(n)	Hoorcollege, Practicum
Niveau	300

Doel vak

The properties of cells and higher levels of organisation emerges out of molecular interactions within huge networks. Examples of such molecular-reaction networks are: metabolism, signal transduction, and gene networks. Systems biology studies the principles of such networks using experiments and theory.

The aim of this course is to introduce the students to the approach taken in systems biology. We will study a number of theoretical findings of systems biology about the dynamics and regulation of molecular networks inside living cells using mathematical models and basic principles of biochemistry and physics.

Inhoud vak

The following topics will be discussed:

- mass-action kinetics and basic enzyme kinetics
- thermodynamic equilibrium and steady state
- dynamics of simple systems
- protein complex formation, allosteric interactions, and cooperativity
- signal-binding induced conformation changes of transcription factors and signalling receptors
- gene control by two transcription factors with allosteric interactions

and cooperativity

- ultrasensitivity of small signalling circuits
- how feedforward loops can give rise to fold change detection
- role of positive and negative feedback

The practicals involve answering exercises and basic plotting of results of mathematical models.

Onderwijsvorm

Hoorcollege, werkcollege, praktische opdrachten

Toetsvorm

Tentamen

Literatuur

Syllabus (gratis)

Vereiste voorkennis

Basale kennis van differential vergelijkingen, (bio-)chemische reacties, en cel biologie.

Doelgroep

3MNV

Internship Communication Specialisation

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

Internship Societal Specialisation

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

Introductie Medische Beeldbewerking

Vakcode	X_432630 (432630)
Periode	Periode 2
Credits	6.0
Voertaal	Engels

Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. ir. T.J.C. Faes
Docent(en)	dr. J.C. de Munck
Lesmethode(n)	Hoorcollege, Practicum
Niveau	300

Doel vak

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

Inhoud vak

Image analysis methods play an increasingly important role in medical science and clinical patient care. This course discusses the most important image analysis techniques and explains how they can be applied. These include image histogram analysis, neighbourhood processing, image fusion, and morphological operations. Rationales for using these techniques are illustrated with examples from several imaging modalities and clinical fields. The student then learns how to apply these techniques practically using MATLAB®. The final mark is the average of the mark obtained at the written examination and the mark obtained at the final practical assignment.

Onderwijsvorm

lectures and practicals.

Toetsvorm

50% written examination,
50% assignment practical work.
Both should be sufficient to pass the exam.

Literatuur

McAndrew, A. Introduction to Digital Image Processing with MATLAB®. (ISBN 0-534-40011-6). This book will be made available through the lecturers at a price of around 60 euros.

Vereiste voorkennis

Two years of studies in Medical Natural Sciences, Physics, Mathematics, or Movement Sciences.

Lasers and Quantum Optics

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

Doel vak

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

Inhoud vak

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

Onderwijsvorm

Lectures, exercises.

Toetsvorm

Written exam.

Literatuur

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

Doelgroep

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

Major Research Project MNS Medical Physics

Vakcode	X_432593 (432593)
Periode	Ac. Jaar (september)
Credits	39.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. ir. T.J.C. Faes
Niveau	600

Major Research Project MNS Medical Physics

Vakcode	X_432772 ()
Periode	Ac. Jaar (september)
Credits	45.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. ir. T.J.C. Faes
Niveau	600

Major Research Project MNS Medical Physics

Vakcode	X_432773 ()
Periode	Ac. Jaar (september)
Credits	51.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. ir. T.J.C. Faes
Niveau	600

Major Research Project MNS Medical Physiology

Vakcode	X_432714 (432714)
Periode	Ac. Jaar (september)
Credits	39.0
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. G.J.M. Stienen
Niveau	600

Major Research Project MNS Medical Physiology

Vakcode	X_432778 ()
Periode	Ac. Jaar (september)
Credits	45.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. G.J.M. Stienen
Niveau	600

Major Research Project MNS Medical Physiology

Vakcode	X_432779 ()
Periode	Ac. Jaar (september)
Credits	51.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. G.J.M. Stienen
Niveau	600

Major Research Project MNS Physics of Life

Vakcode	X_432716 ()
Periode	Ac. Jaar (september)

Credits	39.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. S.M. Witte
Niveau	600

Overige informatie

Period: variable

Major Research Project MNS Physics of Life

Vakcode	X_432774 ()
Periode	Ac. Jaar (september)
Credits	45.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. S.M. Witte
Niveau	600

Major Research Project MNS Physics of Life

Vakcode	X_432775 ()
Periode	Ac. Jaar (september)
Credits	51.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. S.M. Witte
Niveau	600

Master Project Medical Physics (M,C,E-var.)

Vakcode	X_432627 (432627)
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. ir. T.J.C. Faes
Niveau	600

Master Project Medical Physiology (M,C,E-var.)

Vakcode	X_432626 (432626)
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels

Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. G.J.M. Stienen
Niveau	600

Master Project Molecular Clinical Diagnostics (for M,C,E-variant)

Vakcode	X_432628 (432628)
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H. Lingeman
Niveau	600

Doel vak

To acquire knowledge and insight into the rule 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

mMNS

Overige informatie

For further information please contact Henk Lingeman.

Master Project Physics of Life (M,C,E-var.)

Vakcode	X_432629 (432629)
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. S.M. Witte
Niveau	600

Medical Imaging

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

Inhoud vak

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

Doelgroep

mMNS-MPs, mPhys-LSBP, mPhys-PLH

Overige informatie

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

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

Minor Research Project MNS Medical Physics

Vakcode	X_432708 (432708)
Periode	Ac. Jaar (september)
Credits	21.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. ir. T.J.C. Faes
Niveau	500

Minor Research Project MNS Medical Physics

Vakcode	X_432634 (432634)
Periode	Ac. Jaar (september)
Credits	27.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. ir. T.J.C. Faes
Niveau	500

Minor Research Project MNS Medical Physics

Vakcode	X_432780 ()
Periode	Ac. Jaar (september)
Credits	33.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. ir. T.J.C. Faes
Niveau	500

Minor Research Project MNS Medical Physiology

Vakcode	X_432713 (432713)
Periode	Ac. Jaar (september)
Credits	27.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. G.J.M. Stienen
Niveau	500

Minor Research Project MNS Medical Physiology

Vakcode	X_432712 (432712)
Periode	Ac. Jaar (september)
Credits	21.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. G.J.M. Stienen
Niveau	500

Minor Research Project MNS Medical Physiology

Vakcode	X_432782 ()
Periode	Ac. Jaar (september)
Credits	33.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. G.J.M. Stienen
Niveau	500

Minor Research Project MNS Molecular Clinical Diagnostics

Vakcode	X_432781 ()
Periode	Ac. Jaar (september)
Credits	33.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	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

mMNS

Overige informatie

For further information please contact Henk Lingeman.

Minor Research Project MNS Molecular Clinical Diagnostics

Vakcode	X_432710 (432710)
Periode	Ac. Jaar (september)
Credits	21.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	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

mMNS

Overige informatie

For further information please contact Henk Lingeman.

Minor Research Project MNS Molecular Clinical Diagnostics

Vakcode	X_432711 (432711)
Periode	Ac. Jaar (september)
Credits	27.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	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

mMNS

Overige informatie

For further information please contact Henk Lingeman.

Minor Research Project MNS Physics of Life

Vakcode	X_432709 (432708)
Periode	Ac. Jaar (september)
Credits	21.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. S.M. Witte
Niveau	500

Overige informatie

Period: Variable

Minor Research Project MNS Physics of Life

Vakcode	X_432717 ()
Periode	Ac. Jaar (september)
Credits	27.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. S.M. Witte
Niveau	500

Minor Research Project MNS Physics of Life

Vakcode	X_432783 ()
Periode	Ac. Jaar (september)
Credits	33.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. S.M. Witte
Niveau	500

MNS Major Research Project Molecular Clinical Diagnostics

Vakcode	X_432777 ()
Periode	Ac. Jaar (september)
Credits	51.0
Voertaal	Engels

Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	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

mMNS

Overige informatie

For further information please contact Henk Lingeman.

MNS Major Research Project Molecular Clinical Diagnostics

Vakcode	X_432715 ()
Periode	Ac. Jaar (september)
Credits	39.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	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

mMNS

Overige informatie

For further information please contact Henk Lingeman.

MNS Major Research Project Molecular Clinical Diagnostics

Vakcode	X_432776 ()
Periode	Ac. Jaar (september)
Credits	45.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen

Coördinator	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

mMNS

Overige informatie

For further information please contact Henk Lingeman.

Omics-procedures in molecular clinical Diagnostics

Vakcode	X_432766 ()
Periode	Periode 5
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. H. Lingeman
Docent(en)	dr. H. Lingeman
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak

The primary objective of this course is highlighting the various omics-approaches that are used in drug- and biomarker discovery.

Inhoud vak

Omic-approaches involve the comparison of metabolomes, proteomes and genomes between control and test groups to find differences in their profiles. Those differences may be correlated to the disease being studied in clinical biomarker discovery or changes in the metabolic output in toxicology studies. During the course the fundamentals and applications of omic-based techniques will be discussed. The focus will be on the separation (e.g. chromatography, electrophoresis), detection/identification (e.g. MS, NMR, Spectroscopic) and chemometric procedures to unravel complex biological and clinical samples

Onderwijsvorm

Lectures and projects

Literatuur

Hands-outs (electronically available)

Doelgroep

Overige informatie

X_432733 vervalt en is vervangen door X_432766

Parameter Estimation Applied to Medical and Biological Sciences

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

Doel vak

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

Inhoud vak

Linear-non linear parameter models, basic matrix-vector algebra, maximum likelihood principle, correlated-uncorrelated noise, OLS, GLS, nuisance parameters, linear (time invariant) filters, t-test, F-test, confidence intervals, fMRI data model, missing data, MEG/EEG source localisation. These topics are treated in the form of a series of lectures alternated with exercises.

Extra topics: L1 en L2 norms.

Onderwijsvorm

Lecture.

Toetsvorm

Written exam.

Doelgroep

mMNS

Pathophysiology of Heart and Circulation

Vakcode	M_CPATHO09 (3120014)
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	VUmc

Coördinator	dr. W.S. Simonides
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Literatuur

Book: Cardiology, Crawford-Di Marco-Paulus 3rd Ed.(recommended) syllabus including relevant articles.

Book: Pathophysiology of heart disease (Ed L.S. Lilly); syllabus including relevant articles.

Intekenprocedure

Students can register for this course and examinations via vunet.vu.nl (under My study, register for courses and exams). The general VU registration rules apply. Information on registration deadlines can be found in VUnet. Please note that the general VU rules are strict, both for booking of the classes and (resit-)exams.

Physics of Organs 1: Cardio-Pulmonary Physics

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

Inhoud vak

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

Overige informatie

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

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

Physics of Organs 2: Sensory Organs and Bioelectricity

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

Inhoud vak

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

Overige informatie

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

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

Policy, Politics and Participation

Vakcode	AM_470589 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	prof. dr. J.T. de Cock Buning
Docent(en)	dr. B.J. Regeer, dr. J.F.H. Kupper, prof. dr. J.E.W. Broerse
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Doel vak

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

To acquire further insight into the practice of interactive research;

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

To strengthen the skills to design an interactive research project

To practice skills in data collection and analysis;

To learn to set up valid lines of argumentation;

To improve your communication skills;

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

Inhoud vak

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

Specific attention is paid to your personal interactive research skills.

At the end of the course, you

prepare a policy report to present your findings. In an oral presentation your team will highlight the main results of your analysis and defend the recommendations you propose.

Onderwijsvorm

Lectures, training workshops, project assignment

Toetsvorm

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

Literatuur

To be announced on Blackboard

Doelgroep

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

Overige informatie

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

Attendance is compulsory.

Praktijk I

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

Doel vak

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

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

Inhoud vak

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

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

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

Toetsvorm

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

Vereiste voorkennis

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

Praktijk II

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

Doel vak

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

Inhoud vak

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

Professionele ontwikkeling en onderzoek I

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

Doel vak

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

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

Inhoud vak

Dit vak bestaat uit twee delen: een reflectiedeel en een onderzoeksdeel.

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

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

Onderwijsvorm

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

Toetsvorm

Uitvoeren van opdrachten.

Literatuur

Een literatuurlijst wordt verstrekt aan het begin van de opleiding.

Vereiste voorkennis

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

Overige informatie

Voor alle onderdelen geldt een aanwezigheidsplicht.

Professionele ontwikkeling en onderzoek II

Vakcode	O_MLVPOOII ()
Periode	Semester 1, Semester 2
Credits	6.0
Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek
Coördinator	dr. H.B. Westbroek
Docent(en)	dr. C.P. van Velzen, prof. dr. J.J. Beishuizen, drs. W. Jongejan, dr. H.B. Westbroek, dr. E. van den Berg, dr. J.J.M. van Eersel, W. Maas, drs. Y.G. Meindersma, drs. S. Attema-Noordewier, dr. T. Bosma, dr. A.A. Kaal
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	500

Doel vak

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

Inhoud vak

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

Onderwijsvorm

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

instituuitsbegeleiders.

Toetsvorm

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

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

Literatuur

Een literatuurlijst wordt verstrekt aan het begin van de opleiding.

Vereiste voorkennis

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

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

Overige informatie

Voor alle onderdelen geldt een aanwezigheidsplicht.

Qualitative and Quantitative Research Methods

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

Doel vak

Understanding the differences between beta- and gamma research
To acquire insight and understanding of a transdisciplinary research process. This includes knowledge of the character of and need for transdisciplinary approaches, and their advantages and disadvantages
To acquire insight into various quantitative and qualitative research methods and their underlying theoretical concepts
To understand the relative strengths and weaknesses of the various research methods
To know how to interpret quantitative and qualitative findings
To acquire insight and understanding of the possibilities to integrate quantitative and qualitative research information
To be able to make an adequate transdisciplinary research design for the investigation of a specific problem.

Inhoud vak

Contemporary societies increasingly face complex social problems, like climate change, HIV/ AIDS or ethnic and religious diversity . These

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

Onderwijsvorm

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

Toetsvorm

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

Literatuur

Announced on blackboard one month before course starts

Doelgroep

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

Overige informatie

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

Science and Communication

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

Doel vak

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

Inhoud vak

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

Onderwijsvorm

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

Toetsvorm

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

Literatuur

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

Doelgroep

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

Overige informatie

Guest lecturers amongst others:
A. van der Plas (TNO)

Science in Dialogue

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

Doel vak

To gain knowledge and insight into:

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

To acquire or improve:

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

Inhoud vak

This course examines the public character of scientific controversy and focuses on the communicative aspects of a fruitful science-society dialogue. At the dawn of the 21st century, science, and particularly fields that combine science and engineering such as nanotechnology and synthetic biology, holds a great promise for the progress of our societies. At the same time, these developments are controversial. They lead to a variety of concerns related to risks, benefits and wider moral issues. Nanotechnology creates materials with novel characteristics that help us, but may also contain risks for health and environment. Synthetic biology develops new biological systems that may be very useful, but radically change the nature and meaning of life. Clearly, advances in science do not always match the needs, desires and expectations of society. On the other hand, parts of society might not always appreciate the nature and scope of scientific findings. For a fruitful relationship between science and society, a constructive science-society dialogue is necessary.

This course offers advanced lectures on the basic concepts and issues of dialogical science communication: communication, learning, dialogue, understanding, controversy, democracy. A series of workshops and small group assignments presents communicative tools and spaces such as discussion games, science theatre and multimedia platforms that can be used to design and facilitate science-society interactions. Training workshops will focus on improving the students' individual communication and facilitation skills. The students' individual learning curve as a

science communicator and facilitator is monitored by means of a personal development plan. The course is completed with an individual essay assignment about the sense and nonsense of the science-society dialogue.

Onderwijsvorm

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

Toetsvorm

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

Literatuur

Is announced on blackboard one month before start of the course

Doelgroep

Optional course in the MSc specialization Science Communication

Overige informatie

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

Science Journalism

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

Doel vak

To acquire knowledge and insight into:

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

To acquire skills in:

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

Orientation to the professional practice of science journalism

Inhoud vak

This course teaches the basic principles of science journalism. A series of interactive lectures reviews both the practical as well as the theoretical aspects of science journalism. Topics that are discussed are the translation of science to a language that is both compelling and understandable, the role of journalism in the interaction between science and society, images of science in the media and the ethics of

science journalism. The interactive lectures invite you to take your own defensible position with regard to these issues.

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

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

Onderwijsvorm

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

Toetsvorm

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

Literatuur

Announced on Blackboard one month before start of the course

Doelgroep

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

Overige informatie

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

Science Museology

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

Doel vak

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

education and exhibit design to advise on adjustments and/or development of exhibitions.

Inhoud vak

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

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

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

Onderwijsvorm

Lectures (14 h)

Workgroups (40 h)

Home-study for group assignments (64 h)

Home-study for individual assignments (32 h)

Toetsvorm

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

Literatuur

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

Vereiste voorkennis

Bachelor in any of the Beta Sciences

Doelgroep

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

Overige informatie

Guest lecturers:

E. Hamstra (Northernlight)

C. Vermeulen (Artis)

M. van der Meer (Delft Science Centre)

I. van Zeeland (Naturalis)

And possibly additional guest lecturers from NEMO, Boijmans van Beuningen, Museon, Van Gogh Museum, etc.

Scientific Writing in English for Medical Natural Sciences

Vakcode	X_420563 ()
Periode	Periode 3

Credits	3.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	M. van den Hoorn
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak

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

Inhoud vak

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

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

General course outline

Introducing the topics

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

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

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

Writing the actual article

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

Should I use "I" or "we"?

Writing correct English

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

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

Onderwijsvorm

The course is focused on self-tuition. The plenary sessions concentrate on the process of writing and the product of writing. Homework is part of the course. With each topic, participants work through a phased

series of exercises that usually conclude with the requirement to write a short piece of text. The instructor will append extensive written remarks to this text.

Toetsvorm

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

Literatuur

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

Aanbevolen voorkennis

Bachelor Exact Sciences.

Doelgroep

mMNS

Signal Transduction in Health and Disease

Vakcode	X_432535 (432535)
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	prof. dr. M.J. Smit
Docent(en)	dr. M.J. Smit
Lesmethode(n)	Hoorcollege
Niveau	600

Doel vak

At the end of this theoretical course, the students are aware of the latest insights of cellular signal transduction in both healthy and pathological conditions.

Inhoud vak

This course will link human genetic variation (somatic and inherited mutations) to the development of disease and will focus on pathological signaling, mutant signaling proteins in disease and possible treatment of resulting disease (small compounds, biologicals, gene therapy). Modern pharmacological concepts, including constitutive receptor activity, receptor regulation, allosteric modulation and dimerization will be addressed in light of signal transduction in health and disease. A special focus will be on signal transduction resulting in pathologies such as Alzheimer, Parkinson's disease, inflammatory diseases and cancer.

Onderwijsvorm

Lectures, self-study.

Students will do a case study in groups on a receptor/protein family linked to disease. Molecular mechanisms underlying pathology will be addressed and presented.

Toetsvorm

Assignment and presentation, written exam.

Literatuur

Marks e.a., Cellular Signal Processing. Garland Sci (ISBN 0-8153-4215-2).

Papers available on Blackboard

Aanbevolen voorkennis

Bachelor Biology, Medical Biology, Pharmaceutical Sciences, Medical Natural Sciences, Biomolecular Science portal course or equivalent

Doelgroep

mBMS-BC, mDDS-BCCA, mDDS-CMCT, mDDS-DD&S, mDDS-DDSA, mDDS-DDTF, mDDS-C-var, mDDS-E-var, mDDS-M-var, mMNS-MCD, mMNS-MPy

Soft Condensed Matter and Biological Physics

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

Doel vak

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

Inhoud vak

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

Onderwijsvorm

Lectures, and self-study.

Toetsvorm

Homework, Scientific literature presentations and an exam.

Literatuur

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

Doelgroep

mMNS, mPhys-AMEP, mPhys-PLH

Statistical Theory of Complex Molecular Systems

Vakcode	X_428520 (428520)
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Niveau	400

Inhoud vak

The course description is available on <http://studiegids.uva.nl/web/uva/sgs/nl/c/10917.html>

Doelgroep

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

Overige informatie

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

Vakdidactiek Natuurkunde I

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

Doel vak

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

Inhoud vak

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

Onderwijsvorm

Werkcolleges

Toetsvorm

Beoordeling van het portfolio

Literatuur

Een literatuurlijst wordt verstrekt aan het begin van de opleiding

Vereiste voorkennis

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

Overige informatie

Er geldt een aanwezigheidsplicht

Vakdidactiek Natuurkunde II

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

Doel vak

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

Inhoud vak

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

Onderwijsvorm

Werkcolleges

Toetsvorm

Beoordeling van het portfolio

Literatuur

Een literatuurlijst wordt verstrekt aan het begin van de opleiding

Vereiste voorkennis

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

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

Overige informatie

Er geldt een aanwezigheidsplicht

Vakdidactiek Scheikunde I

Vakcode	O_MLVDSKI ()
Periode	Semester 1, Semester 2
Credits	3.0
Voertaal	Nederlands
Faculteit	Faculteit der Psychologie en Pedagogiek
Coördinator	dr. H.B. Westbroek
Docent(en)	dr. H.B. Westbroek
Lesmethode(n)	Werkcollege
Niveau	500

Doel vak

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

Inhoud vak

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

Onderwijsvorm

Werkcolleges

Toetsvorm

Beoordeling van het portfolio

Literatuur

Een literatuurlijst wordt verstrekt aan het begin van de opleiding

Vereiste voorkennis

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

Overige informatie

Er geldt een aanwezigheidsplicht

Vakdidactiek Scheikunde II

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

Lesmethode(n)	Werkcollege
Niveau	500

Inhoud vak

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

Onderwijsvorm

Werkcolleges

Toetsvorm

Beoordeling van het portfolio

Literatuur

Een literatuurlijst wordt verstrekt aan het begin van de opleiding

Vereiste voorkennis

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

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

Overige informatie

Er geldt een aanwezigheidsplicht

Verdieping

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

Doel vak

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

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

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

Inhoud vak

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

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

Onderwijsvorm

Hoorcollege, werkcollege.

Toetsvorm

Bespreking van een casus.

Literatuur

Syllabus met artikelen wordt verstrekt.

Voortgezette Biostatistiek

Vakcode	X_401078 ()
Periode	Periode 4
Credits	3.0
Voertaal	Nederlands
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. W.N. van Wieringen
Docent(en)	dr. W.N. van Wieringen
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	400

Doel vak

Het bekend raken met statistische begrippen en technieken die een rol spelen in het modelleren en analyseren van processen op het moleculaire niveau van de cel. Onder andere Markov modellen, regressie modellen, en Gaussische graphische modellen komen aan bod. Naast het modelleren wordt aandacht besteed aan het schatten van de model parameters aan de hand van data. Uiteindelijk dient de student zelfstandig bovengenoemde statistische analyse uit te kunnen voeren alsmede die van derden kritisch te beoordelen.

Inhoud vak

Het college valt zelf in twee stukken uit, qua toepassing, data type (discreet vs. continue), en modellen en technieken.

Echter, in beide college-stukken worden processen in de cel gemodelleerd. Een gebeurtenis in de cel staat niet op zichzelf, maar is verweven met de rest van de cel. In dit gehele college deel worden deze afhankelijkheden gemodelleerd. Waar mogelijk worden voorbeelden afkomstig uit het VUmc ziekenhuis gebruikt om de statistische technieken te illustreren.

In het eerste stuk van dit college-deel staat het modelleren van de DNA

sequentie centraal. Resulterende modellen worden aangewend om de evolutie van een kankercel te beschrijven. Of, middels hidden Markov modellen wordt de exon-intron structuur van een gen te ontrafeld. Maar ook wordt de evolutie van het DNA beschreven om vervolgens phylogenetische bomen (afstammingsbomen) te reconstrueren.

In het tweede stuk wordt mbv verschillende technieken gepoogd de topologische structuur van het regulatoire netwerk van de cel (een pathway) te reconstrueren op basis van gen expressie data. Dat wil zeggen, kunnen we achterhalen welk gen met welk gen samenwerkt in de cel?

Onderwijsvorm

Combinatie van hoor- en werkcollege.

Toetsvorm

Schriftelijk tentamen.

Literatuur

College slides plus artikelen die op het college bekend gemaakt worden.

Vereiste voorkennis

Aanbevolen voorkennis: Biostatistiek 1 en 2 voor MNW.

Doelgroep

3MNW

Overige informatie

Dit vak komt in plaats Biostatistiek X_401057.