Artificial Intelligence MSc

VU University Amsterdam - Faculteit der Exacte Wetenschappen - M Artificial Intelligence - 2015-2016

Research in Artificial Intelligence concerns the analysis and modelling of tasks that are commonly assumed to require human intelligence, as well as the design of systems that can perform or support such tasks. Such research requires a wide varience of activities, from observing and interviewing human expert to designing and implementing computer programs, and creating mathematical models.

Artificial Intelligence integrates computer science with (cognitive) psychology. Other ingredients are biology, linguistics, philosophy and logic, all used to understand and describe the underlying principles of human cognitive processes, including reasoning and natural language understanding. For these reasons Artificial Intelligence is a broad and multi-disciplinary research area.

The programme consists of a Bachelors study (taking 3 years) and a Master study (taking 2 years). The Bachelors study is dedicated to providing the student with a broad and thorough basis in Artificial Intelligence, whereas the Masters provides the student with an opportunity to specialise in an area and further deepen his knowledge of AI in general. Both Bachelors and Masters studies are organised by the Faculty of Sciences in close cooperation with the Faculty of Psychology and Pedagogy, and the Faculties of Arts. Furthermore, the students can follow courses at the Universiteit van Amsterdam. Information about the Bachelor programme can be found in a separate study guide.

Depending on the chosen Master programme the student attends lectures in other faculties, for example Psychology, Linguistics, Economy, Law, Social Sciences, and Biology. Graduation projects vary from practical to rather fundamental, depending on the preferences and capacities of the students. Students can go to companies, research institutes or universities either in The Netherlands or abroad.

Examples of projects and locations, and more information on what such a project entails, can be found at: http://www.cs.vu.nl/ai > Term Projects.

Masters in Artificial Intelligence are employed by companies that develop AI-systems either for their own company (for example banks, insurance companies) or in commission for other companies (software companies). Masters in AI are also employed as consultants, for example for the management of knowledge within organisations. Research and education is another area where masters in AI build a future for themselves, for example at universities or research institutes doing research in Artificial Intelligence.

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Research variant Cognitieve Science

This specialisation focuses on the study of human cognition through computational methods. The programme is organised based on a close collaboration between the Faculty of Sciences (Department of Computer Science) and the Faculty of Psychology and Education (Department of Cognitive Psychology), and indeed includes courses from both departments.
Students in Cognitive Science come from a wide range of backgrounds – including psychology, computer science, artificial intelligence, philosophy, mathematics, neuroscience, and others – but share the common goal, to get a better understanding of the human mind through computational modelling. The developed models can roughly be applied from two perspectives. Firstly, from a more theoretical perspective, cognitive models (e.g., of perception, attention, or decision making) can serve as a useful tool for researchers to gain more insight in the dynamics of cognitive processes by building (and simulating) them. Secondly, from a more practical perspective, cognitive models can serve as a basis for the development of artefacts that either show or understand human-like behaviour. Examples of artefacts that show human-like behaviour are virtual characters in (serious) games, and examples of artefacts that understand human-like behaviour are intelligent support systems in cars or in military domains.

The progamme consists of 120 credits

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

Programme components:

- Recommended Optional Courses
- Constrained Choice Data Analysis
- Constrained Choice
- Compulsory Courses
- Constrained Choice
- Limited offered course

Recommended Optional Courses

Courses:

Name	Period	Credits	Code
Agent Systems	Period 4	6.0	X_405123
Behaviour Dynamics in Social Networks	Period 2	6.0	X_400113
History of digital cultures	Period 3	6.0	X_418107
ICT4D: Information and communication technology for Development	Period 5	6.0	X_405101
Internet programming	Period 1	6.0	X_405082

Memory and Memory Disorders		6.0	P_MMEMORY
Mini-Master Project AI	Ac. Year (September)	6.0	X_400428
Review Paper	Ac. Year (September)	6.0	P_MREVPAP
Seminar Attention	Period 5	6.0	P_MSEMATT

Constrained Choice Data Analysis

Courses:

Name	Period	Credits	Code
Advanced Data Analysis	Period 1	6.0	P_MADVDAT
Experimental Design and Data Analysis	Period 5	6.0	X_405078

Constrained Choice

Courses:

Name	Period	Credits	Code
Computational Intelligence and Learning Machines	Period 2	6.0	X_417015
Evolutionary Computing	Period 1	6.0	X_400111

Compulsory Courses

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.

Courses:

Name	Period	Credits	Code
Brain Imaging	Period 4	6.0	P_MBRIMAG
Human Information Processing		6.0	P_MHINFOP
Interdisciplinary Research Methodology for IS	Period 2	6.0	X_405085
Knowledge Engineering	Period 2+3	6.0	X_405099
Model-based Intelligent Environments	Period 1	6.0	X_405056
Neural Models of Cognitive Processes	Period 2	6.0	P_MNEUMOD
Seminar Cognitive Neuroscience	Period 1	6.0	P_MSEMCNS

Thinking and Deciding	Period 2	6.0	P_MTHIDEC

Constrained Choice

Courses:

Name	Period	Credits	Code
Master Project	Ac. Year (September)	30.0	X_400285
Master Thesis: Research Project Cognitive Science	Ac. Year (September)	30.0	P_MTHRCSC

Limited offered course

This course is taught this year only at our University. Philippe Kruchten is Professor of Software Engineering at the University of British Columbia in Vancouver. He is world-famous as the chief designer of the Rational Unified Process (RUP) and currently he is doing research on Agile Architectures. He will give this course specially for our Master Computer Science and Master Information Sciences students.

Courses:

Name	Period	Credits	Code
Watson Innovation	Period 2	6.0	X_405129

Research Variant Human Ambience

In the Master variant Human Ambience you learn on a detailed level how to model both mental and physiological processes of human functioning. For instance, you can learn how to model the mental and physical states associated with depression. Such models are then used in applications that support humans in their daily lives in a dedicated manner, also to enable the developed support systems to understand humans better. In the specialization phase of the master you can study relevant courses with respect to an application area (e.g. support of people during exercising, or elderly care) or a relevant scientific discipline (e.g. psychology, sociology, movement sciences, biomedical sciences, criminology, etc.). During you final Master project you will then combine your domain knowledge with the knowledge of modeling such human processes.

The progamme consists of 120 credits

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

Programme components:

- Constrained Choice

- Optional courses
- Recommended elective Courses
- Constrained choice Statistics
- Compulsory Courses
- Limited offered course

Constrained Choice

Courses:

Name	Period	Credits	Code
Computational Intelligence and Learning Machines	Period 2	6.0	X_417015
Evolutionary Computing	Period 1	6.0	X_400111

Optional courses

N.B. Students can compose an individual programme by selecting all optional courses from one specific discipline, but also by combining courses from different disciplines, which have a common application.

Programme components:

- Optional courses Health
- Optional courses Mental Fuctioning/Health
- Optional courses Movement
- Optional courses Criminology
- Optional courses Safety/Networks/Policy

Courses:

Name	Period	Credits	Code
Advanced Logic	Period 4	6.0	X_405048
Data Mining Techniques	Period 5	6.0	X_400108
ICT4D: Information and communication technology for Development	Period 5	6.0	X_405101
Information Retrieval 1	Period 3	6.0	X_418043
Knowledge and Media	Period 1	6.0	X_405065
Knowledge Representation on the Web	Period 5	6.0	X_418169
Mini-Master Project AI	Ac. Year (September)	6.0	X_400428

Optional courses Health

Courses:

Name	Period	Credits	Code

Health Promotion and Disease Prevention	Period 1	6.0	AM_470811
Health Psychology	Period 2	6.0	AM_470730
Prevention of Mental Health Problems	Period 3	6.0	AM_470840

Optional courses Mental Fuctioning/Health

Courses:

Name	Period	Credits	Code
Aging and Dementia	Period 1, Period 3	6.0	P_MAGINGD
Brain Imaging	Period 4	6.0	P_MBRIMAG
Memory and Memory Disorders		6.0	P_MMEMORY
Seminar Attention	Period 5	6.0	P_MSEMATT
Seminar Cognitive Neuroscience	Period 1	6.0	P_MSEMCNS
Thinking and Deciding	Period 2	6.0	P_MTHIDEC

Optional courses Movement

Courses:

Name	Period	Credits	Code
Coordination Dynamics: principles and applications	Period 2	6.0	B_CLINCORDYN
Energy Flow Models	Period 1	3.0	B_ENERFLOW
Linear System Dynamics	Period 1	3.0	B_DYNAMICA
Perception for Action	Period 4	3.0	B_PERCACTION

Optional courses Criminology

Courses:

Name	Period	Credits	Code
Crime Analysis & Offender Profiling	Period 2	6.0	R_Misd.anaC
Spatial Criminology	Period 5	6.0	R_SpaCrim

Optional courses Safety/Networks/Policy

Courses:

Name	Period	Credits	Code
Entrepreneurship and Innovation, a Relational Perspective	Period 2	6.0	S_OIRP
Governance of Security and Policing	Period 2	6.0	S_GSP
Networked Organizations and Communication	Period 2	6.0	S_NOC
Physical Security and Crisis Management	Period 4	6.0	S_FVC
Policy and Management	Period 1	6.0	S_BLM
Security and Citizenship	Period 2	6.0	S_VB

Recommended elective Courses

Courses:

Name	Period	Credits	Code
History of digital cultures	Period 3	6.0	X_418107
Intelligent Interactive Systems	Period 1	6.0	X_418023
Psychology of Effective Gaming	Period 1	6.0	X_418145
Serious Games	Period 5	6.0	X_405097
Technology for Games	Period 2	6.0	X_418146
The Social Web	Period 4	6.0	X_405086

Constrained choice Statistics

Courses:

Name	Period	Credits	Code
Advanced Data Analysis	Period 1	6.0	P_MADVDAT
Experimental Design and Data Analysis	Period 5	6.0	X_405078

Compulsory Courses

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.

Courses:

Name	Period	Credits	Code
Agent Systems	Period 4	6.0	X_405123
Behaviour Dynamics in Social Networks	Period 2	6.0	X_400113
Interdisciplinary Research Methodology for IS	Period 2	6.0	X_405085
Knowledge Engineering	Period 2+3	6.0	X_405099
Master Project	Ac. Year (September)	30.0	X_400285
Model-based Intelligent Environments	Period 1	6.0	X_405056

Limited offered course

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Courses:

Name	Period	Credits	Code
Watson Innovation	Period 2	6.0	X_405129

Research variant Data Science

This specialization focuses on understanding, analyzing and working with large amounts of data. Students study the entire Data Science lifecycle from data acquisition and management to analysis and visualization. These techniques include machine learning and data mining, large scale data management, information visualization and reasoning over web data. There is a strong emphasis on applying artificial intelligence techniques to Data Science problems and in particular setting up experiments and performing informative analyses. Students will have the opportunity to apply their knowledge to large real world datasets like those from social media or the web. During the final Masters project, students will put together all facets of their education to tackle a data science problem.

The progamme consists of 120 credits

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

Programme components:

- Data Analysis
- Data Management
- Optional Courses
- Compulsory Courses

- Limited offered course

Data Analysis

Compulsory 12 ec

Courses:

Name	Period	Credits	Code
Applied Language Technology	Period 1	6.0	X_405120
Data Mining Techniques	Period 5	6.0	X_400108
Information Retrieval 1	Period 3	6.0	X_418043

Data Management

Compulsory 12 ec

Courses:

Name	Period	Credits	Code
Distributed Systems	Period 2	6.0	X_400130
Knowledge and Media	Period 1	6.0	X_405065
Knowledge Representation on the Web	Period 5	6.0	X_418169
The Social Web	Period 4	6.0	X_405086

Optional Courses

Courses:

Name	Period	Credits	Code
Advanced Logic	Period 4	6.0	X_405048
Advanced Selforganisation	Period 2	6.0	X_400434
Behaviour Dynamics in Social Networks	Period 2	6.0	X_400113
Coding and Cryptography	Period 1	6.0	X_405041
Concurrency and Multithreading	Period 1	6.0	X_405064
Distributed Algorithms	Period 2	6.0	X_400211
History of digital cultures	Period 3	6.0	X_418107
ICT4D: Information and communication technology for Development	Period 5	6.0	X_405101
Internet programming	Period 1	6.0	X_405082
Logical Verification		6.0	X_400115

Mini-Master Project AI	Ac. Year (September)	6.0	X_400428
Mobile Systems	Period 4	6.0	X_418068
Neural Networks	Period 1	6.0	X_400132
Service Oriented Design	Period 1	6.0	X_405061
Software Architecture	Period 2	6.0	X_400170
Software Testing	Period 5	6.0	X_400439

Compulsory Courses

Courses:

Name	Period	Credits	Code
Evolutionary Computing	Period 1	6.0	X_400111
Experimental Design and Data Analysis	Period 5	6.0	X_405078
Information Visualization	Period 4	6.0	X_418143
Interdisciplinary Research Methodology for IS	Period 2	6.0	X_405085
Knowledge Engineering	Period 2+3	6.0	X_405099
Large Scale Data Engineering	Period 4	6.0	X_405116
Machine Learning 1	Period 1	6.0	X_418144
Master Project	Ac. Year (September)	30.0	X_400285
Model-based Intelligent Environments	Period 1	6.0	X_405056

Limited offered course

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Courses:

Name	Period	Credits	Code
Watson Innovation	Period 2	6.0	X_405129

Research variant Intelligent Systems

This specialisation combines the ‘bottom-up’ and ‘top-down’ design approaches to systems that perceive, reason, learn and act intelligently. Students study the architecture, components, modules, representations and interfaces of intelligent systems. Students combine courses in declarative formal representations with strongly algorithmic approaches. There is a strong emphasis on experimentation.

The intelligent systems considered vary from adaptive and collective systems to ‘symbol-systems’. The adaptive systems often use algorithms based on inspiration from nature such as evolutionary algorithms and self-organisation. The ‘symbol-systems’ are typically based on various forms of logic, structured representations of knowledge and reasoning by symbol-manipulation.

The progamme consists of 120 credits

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

Programme components:

- Constrained Choice (12 EC)
- Optional Courses
- Compulsory Courses
- Limited offered course

Constrained Choice (12 EC)

Courses:

Name	Period	Credits	Code
Agent Systems	Period 4	6.0	X_405123
Experimental Design and Data Analysis	Period 5	6.0	X_405078
Information Retrieval 1	Period 3	6.0	X_418043
Neural Networks	Period 1	6.0	X_400132

Optional Courses

Courses:

Name	Period	Credits	Code
Advanced Logic	Period 4	6.0	X_405048
Behaviour Dynamics in Social Networks	Period 2	6.0	X_400113
Distributed Algorithms	Period 2	6.0	X_400211
Distributed Systems	Period 2	6.0	X_400130
History of digital cultures	Period 3	6.0	X_418107
ICT4D: Information and communication technology for Development	Period 5	6.0	X_405101
Knowledge and Media	Period 1	6.0	X_405065
Large Scale Data Engineering	Period 4	6.0	X_405116
Mini-Master Project AI	Ac. Year (September)	6.0	X_400428

Compulsory Courses

Courses:

Name	Period	Credits	Code
Advanced Selforganisation	Period 2	6.0	X_400434
Data Mining Techniques	Period 5	6.0	X_400108
Evolutionary Computing	Period 1	6.0	X_400111
Interdisciplinary Research Methodology for IS	Period 2	6.0	X_405085
Knowledge Engineering	Period 2+3	6.0	X_405099
Knowledge Representation on the Web	Period 5	6.0	X_418169
Master Project	Ac. Year (September)	30.0	X_400285
Model-based Intelligent Environments	Period 1	6.0	X_405056

Limited offered course

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Courses:

Name	Period	Credits	Code
Watson Innovation	Period 2	6.0	X_405129

Advanced Data Analysis

Course code	P_MADVDAT (815033)
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. M. Gallucci
Examinator	dr. M. Gallucci
Teaching staff	dr. M. Gallucci
Teaching method(s)	Lecture
Level	400

Course objective
This course provides a theoretical overview and detailed practical knowledge concerning statistical analyses of psychological data.

Course content
After an introduction of the general linear model, with emphasis on estimation of effect sizes and hypothesis testing, the course concentrates on applications of the model, such as analysis of variance, regression analysis, path analysis, and logistic regression. Along with these techniques, issues such as mediation, moderation, and hypothesis testing are considered. The aim of the course is to enable students to plan, execute, and interpret appropriate statistical analyses for applied and experimental research data. Because the application of advanced statistical techniques is central to the course, students will have several assignments to analyze existing data sets, and interpret the results.

Form of tuition
Lectures and tutorials.

Type of assessment
Exam and assignments.

Course reading
- Cohen, J., Cohen, P., West, S.G., & Aiken, L.S. (2003), Applied Multiple regression / correlation; analysis for the behavioural sciences (3rd ed.) Hillsdale, NJ: Erlbaum
- Additional material provided during the course.

Advanced Logic

Course code	X_405048 (405048)
Period	Period 4
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	dr. F. van Raamsdonk
Examinator	dr. F. van Raamsdonk
Teaching staff	dr. F. van Raamsdonk
Teaching method(s)	Lecture, Seminar
Level	500

Course objective
The objective is to obtain a good understanding of modal logic and its use in computer science and artificial intelligence.

Course content
A thorough introduction to modal logics, and its applications in computer science and artificial intelligence. We will select some themes from the book Modal Logics for Open Minds, by Johan van Benthem: basic modal logic and possible world semantics, bisimulation and invariance, modal definability, decidability, ... In particular we treat the modal logics most relevant to computer science and AI: temporal, dynamic and epistemic logic.

Form of tuition
Weekly 2 lectures and 1 exercise class, for the duration of 7 weeks.

Type of assessment
A written exam and assignments that can make half a point bonus.

Course reading
Johan van Benthem, Modal Logics for Open Minds, CSLI Publications 2010.

Recommended background knowledge
The bachelor course Logica en Modelleren (previously Inleiding Logica),
or an equivalent introduction to first-order logic.

Target group
mAI, mCS, mPDCS

Advanced Selforganisation

Course code	X_400434 (400434)
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Teaching method(s)	Lecture
Level	400

Course objective
To understand, simulate and analyse the behaviour and self-organization of complex systems. The student is able to explain, implement and recognize basic principles and properties of such systems.

Course content
This course is about the understanding of the behavior and self-organization of complex systems: systems in which the interaction of the components is not simply reducible to the properties of the components. The general question the we address is: how should systems of very many independent computational (e.g. robotic or software) agents cooperate in order to process information and achieve their goals, in a way that is efficient, self- optimizing, adaptive, and robust in the face of damage or attack? We will look at natural systems that solve some of the same problems that we want to solve, e.g. adaptive path minimization by ants, wasp and termite nest building, army ant raiding, fish schooling and bird flocking, coordinated cooperation in slime molds, synchronized firefly flashing, evolution by natural selection, game theory and the evolution of cooperation. The course includes a practical part in which students implement a simulation of a self-organizing complex system and conduct structured experimental analysis with this simulation.

Form of tuition
Theory in lectures and practice in labs.

Type of assessment
Report including description of simulation and experimental analysis.

Course reading
Schut M.C., Scientific Handbook for Simulation of Collective Intelligence, 2007. Will be distributed in class.

Target group
mAI, mBA, mCS, mPDCS

Remarks
More information available on BlackBoard. This is a project- oriented course and therefore students will be expected to have basic programming skills.

Agent Systems

Course code	X_405123 ()
Period	Period 4
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	dr. T. Bosse
Examinator	dr. M.C.A. Klein
Level	400

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

Aging and Dementia

Course code	P_MAGINGD (815181)
Period	Period 1, Period 3
Credits	6.0
Language of tuition	English
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	prof. dr. E.J.A. Scherder
Examinator	prof. dr. E.J.A. Scherder
Teaching staff	prof. dr. E.J.A. Scherder
Teaching method(s)	Lecture
Level	400

Course objective
Provide an advanced course on the neuropathological, cognitive and behavioural consequences of aging and age- related neurodegenerative diseases, in particular dementia.

Course content
The neuropathology characteristic for aging and various subtypes of dementia will be related to specific functional neuronal circuits. Based on these functional neuronal circuits the clinical outcome in terms of cognitive and behavioural disorders will be explained.

Specific attention will be given to the relationship between dementia and motor activity and between dementia and pain experience.

Form of tuition
Plenary lectures, with an emphasis on interaction with the students.

Course reading
E. Scherder. Aging and Dementia. Neuropsychology, motor skills and pain. VU Uitgeverij.

Remarks
This course will be lectured twice:
- In periode 1 the course is sceduled for the Research master Cognitive neuropsychology.
- In period 3 the course is sceduled for the Master psychology, trace Clinical neuropsychology.

Applied Language Technology

Course code	X_405120 ()
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Teaching staff	dr. H.D. van der Vliet
Teaching method(s)	Lecture

Course content
http://studiegids.uva.nl/xmlpages/page/2015-2016/zoek-vak/vak/22568

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

Behaviour Dynamics in Social Networks

Course code	X_400113 (400113)
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	prof. dr. J. Treur
Examinator	prof. dr. J. Treur
Teaching staff	prof. dr. J. Treur
Teaching method(s)	Lecture, Practical
Level	400

Course objective
To learn how to identify, specify and predict different types of behaviour of single agents and agents in groups and social networks ; to

understand how
externally observable behaviour emerges
from internal mechanisms, and how group behaviour emerges from single agent behaviour; to be able to construct computational
behavioural models and to perform analysis based on these models using software tools and empirical data

Course content
Behavioural dynamics in social networks occurs in different forms, contexts and complexity.
During the course examples of such behaviour in social networks are studied. The
dynamics of such behaviour is analysed (including verification and validation), modelled and simulated in this course using different techniques and tools.

Form of tuition
Combinations of lectures and practical assignments.

Type of assessment
Practical assignments.

Course reading
Online reader.

Entry requirements
Knowledge in mathematical logics (in particular, first-order predicate logic), logic programming

Recommended background knowledge
Somer background in modelling and logical formalisms.

Target group
mAI

Brain Imaging

Course code	P_MBRIMAG (815103)
Period	Period 4
Credits	6.0
Language of tuition	English
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. T.H.J. Knapen
Examinator	dr. T.H.J. Knapen
Teaching staff	dr. T.H.J. Knapen, D.M. van Es MSc
Teaching method(s)	Lecture
Level	400

Course objective
Students will learn to analyse and interpret imaging data from different modalities, such as fMRI and EEG. Emphasis will be placed on the analysis of imaging data as time series.

Course content

Treatment of the mathematical and physical concepts of the different recording techniques, among which basic linear algebra, Fourier analysis and GLM.
Students will learn to programmatically analyse fMRI and EEG data using Python. Standard GLM analysis for fMRI is conducted using FSL.
Half of the course will be practicals in which students will gain hands-on experience with EEG and fMRI data analysis using open-source tools.
Each student will be required to discuss one paper from the field at the end of the course.

Form of tuition
Class teaching, Practicals, Presentations

Type of assessment
Final Exam, open-end questions 40%
Practical assignments 40%
Article presentation 20%

Course reading
Handbook of Functional MRI Data Analysis, Poldrack et al, Cambridge press. Further EEG analysis literature to be announced.

Remarks
Prior knowledge of Python programming and statistics is recommended.

Coding and Cryptography

Course code	X_405041 (405041)
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	prof. dr. R.M.H. de Jeu
Examinator	prof. dr. R.M.H. de Jeu
Teaching staff	prof. dr. R.M.H. de Jeu
Teaching method(s)	Lecture
Level	500

Course objective
To give an introduction the theory of error correcting codes and to cryptography.

Course content
This course provides a thorough introduction to the theory of error correcting codes, and to cryptography. It is aimed especially at students of Computer Science. For error correcting codes we shall include cyclic codes, BCH codes, Reed-Solomon codes and burst error correction. For cryptography we discuss some modern public key cryptography (e.g., RSA, ElGamal, DSA).

Form of tuition
Lectures and exercise classes

Type of assessment

Written exam and homework. The written exam will count for 80 percent of the grade, the homework will count for 20 percent of the grade. If not both the written exam and the homework are at least 55 percent each, then the maximum score will be 54 percent (which constitutes a fail).

Course reading
We shall be working from "Coding theory and cryptography, the essentials" by Hankerson, Hoffman, Leonard, Lindner, Phelps, Rodger and Wall (second edition, revised and expanded).

Recommended background knowledge
Some knowledge on linear algebra, on the integers modulo n, and on polynomials.

Target group
mAI, mCS, mMath, mPDCS

Computational Intelligence and Learning Machines

Course code	X_417015 ()
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	prof. dr. A.E. Eiben
Examinator	prof. dr. A.E. Eiben
Level	400

Course content
http://studiegids.uva.nl/xmlpages/page/2015-2016/zoek-vak/vak/1132339

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

Concurrency and Multithreading

Course code	X_405064 (405064)
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	prof. dr. W.J. Fokkink
Examinator	prof. dr. W.J. Fokkink
Teaching staff	prof. dr. W.J. Fokkink
Teaching method(s)	Lecture, Seminar
Level	400

Course objective
This course provides a comprehensive presentation of the foundations and programming principles for multicore computing devices.

Learning objectives are: fundamental insight into multicore computing; algorithms for multicore computing; analyzing such algorithms; concurrent datastructures; multicore programming.

Course content
Shared memory, mutual exclusion, synchronization operations, concurrent data structures, scheduling, transactional memory, multithreaded programming assignment.

Form of tuition
Lectures: 4 hours per week, exercise classes: 4 hours per week.

Type of assessment
Written exam (which counts for 70% of the final mark) and one programming assignment (which counts for 30% of the final mark).

Course reading
Maurice Herlihy, Nir Shavit, The Art of Multiprocessor Programming, Morgan Kaufmann, 2008.

Target group
mAI, mCS, mPDCS

Remarks
The homepage of the course is at http://www.cs.vu.nl/~tcs/cm/

The lectures and written exam of the BSc and MSc variant of Concurrency and Multithreading coincide. The difference is that the BSc variant has a smaller programming assignment than the MSc variant.

The MSc variant of this course cannot be followed by students that included the BSc variant in their BSc program.

Coordination Dynamics: principles and applications

Course code	B_CLINCORDYN (900666)
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. M. Roerdink
Examinator	dr. M. Roerdink
Teaching staff	dr. M. Roerdink
Teaching method(s)	Lecture, Computer lab, Practical, Meeting,
Level	400

Course objective
The coordination dynamics approach is pursued to study how patterns of coordinated movement come about, persist and change as a function task constraints, expertise and pathology. The student is acquainted with the key principles, concepts and methods of coordination dynamics. The

student can explain these aspects in a qualitative manner. The student is able to indicate how these aspects may contribute to assessments and interventions in the context of sports and rehabilitation. The student can interpret scientific literature in the area of coordination dynamics. The student can design new basic or applied coordination dynamics experiments.

Course content
Coordination dynamics is governed on the one hand by principles of self-organization, and on the other hand by intentionality, perceptual information and explicit knowledge. Coordination patterns exist at multiple levels: 1. dynamics within or between body segments of a moving person; 2. dynamics between moving segments of multiple persons and 3. dynamics between person and external events, as well as between persons. Coordination dynamics provides a framework to study the nature of pathological, normal and expert movements by assessing stability and loss of stability of coordination patterns as a function of training and rehabilitation.
The first part of the course provides an overview of the key principles, concepts and methods of coordination dynamics by adopting a 3-stage empirical approach: 1. gaining background theoretical information through lectures and literature, 2. gaining hands-one experience by participating in experiments, formulating hypotheses and analyzing the so-obtained data, 3. gaining a thorough understanding of the key aspects of coordination dynamics by linking theory and practice.
The second part of the course focuses on the application of coordination dynamics in sports and rehabilitation, again by adopting a 3-stage empirical approach. In the context of rehabilitation, specific emphasis will be placed on interventions based on environmental coupling aimed at facilitating desired coordination patterns and/or stabilizing existing unstable coordination patterns. In the context of sports, the nature of interactions between two or more athletes will be the focal point, including their cooperative and competitive effects on pattern formation and coordinative stability.

Form of tuition
Amount of contact hours (36 hrs), divided in:
Lectures: 10 * 1.75 hrs
Laboratories: 2 * 2.00 hrs
Computer Practicals: 5 * 2.00 hrs
Midterm Exam: 1 * 1.75 hrs
Exam: 2.75 hrs

Self study: 132 hrs

Type of assessment
Written closed-book exams with open-ended questions. The final grade is determined by both the Midterm Exam (25%) and the Final Exam (75%). However, in case the grade of the Midterm Exam is lower than that of the Final Exam, the final grade is fully determined by the Final Exam grade (i.e., Midterm Exam [0%], Final Exam [100%]).

Course reading
A selection of relevant book chapters and articles.

Entry requirements
Basic understanding of statistics (What is a standard deviation?), sine waves (What is the amplitude, offset, frequency and phase?), integral and differential calculus (What is the derivative of a sine wave?) and

Matlab (Can you run a script?). Please note that Matlab scripts and functions are provided and so programming skills are not required for the computer practicals. Computer practicals are included to become acquainted with the handling and interpretation of the experimental data and associated coordination dynamics outcome measures).

Registration procedure
For more info on workgroups, laboratories, (computer) practicals etc. please see Blackboard.

Remarks
Note that Laboratory 2 will be held at the Duyvensz-Nagel Research Laboratory of Reade Center for Rehabilitation and Rheumatology (DNO, Reade, Overtoom 283). Students can subscribe for Laboratories and Computer Practicals on BlackBoard.

Crime Analysis & Offender Profiling

Course code	R_Misd.anaC (212404)
Period	Period 2
Credits	6.0
Language of tuition	Dutch
Faculty	Faculteit der Rechtsgeleerdheid
Coordinator	dr. J.J. van der Kemp
Examinator	dr. J.J. van der Kemp
Teaching staff	drs. W.M.E.H. Beijers, dr. J.J. van der Kemp
Teaching method(s)	Lecture, Seminar
Level	400

Data Mining Techniques

Course code	X_400108 (400108)
Period	Period 5
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	dr. M. Hoogendoorn
Examinator	dr. M. Hoogendoorn
Teaching staff	dr. M. Hoogendoorn
Teaching method(s)	Lecture
Level	500

Course objective
The aim of the course is that students acquire data mining knowledge and skills that they can apply in a business environment. How the aims are to be achieved: Students will acquire knowledge and skills mainly through the following: an overview of the most common data mining algorithms and techniques (in lectures), a survey of typical and interesting data mining applications, and practical assignments to gain "hands on" experience. The application of skills in a business environment will be simulated through various assignments of the course.

Course content
The course will provide a survey of basic data mining techniques and their applications for solving real life problems. After a general introduction to Data Mining we will discuss some "classical" algorithms like Naive Bayes, Decision Trees, Association Rules, etc., and some recently discovered methods such as boosting, Support Vector Machines, and co-learning. A number of successful applications of data mining will also be discussed: marketing, fraud detection, text and Web mining, possibly bioinformatics. In addition to lectures, there will be an extensive practical part, where students will experiment with various data mining algorithms and data sets. The grade for the course will be based on these practical assignments (i.e., there will be no final examination).

Form of tuition
Lectures (h) and compulsory practical work (pra). Lectures are planned to be interactive: there will be small questions, one-minute discussions, etc.

Type of assessment
Practical assignments (i.e. there is no exam). There will be two assignments done in groups of three. There is a possibility to get a grade without doing these assignments: to do a real research project instead (which will most likely to involve more work, but it can also be more rewarding). For the regular assignments the first assignment counts for 40% and the second for 60%. The grade of both assignments needs to be sufficient to pass the course.

Course reading
Ian H. Witten, Eibe Frank, Mark A. Hall, Data Mining: Practical Machine Learning Tools and Techniques (Third Edition). Morgan Kaufmann, January 2011
ISBN 978-0-12-374856-0

Recommended background knowledge
Kansrekening and Statistiek or Algemene Statistiek (knowledge of statistics and probabilities) or equivalent. Recommended: Machine Learning.

Target group
mBA, mCS, mAI, mBio

Distributed Algorithms

Course code	X_400211 (400211)
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	prof. dr. W.J. Fokkink
Examinator	prof. dr. W.J. Fokkink
Teaching staff	prof. dr. W.J. Fokkink
Teaching method(s)	Lecture, Seminar
Level	500

Course objective
To obtain a good understanding of concurrency concepts and a large range of distributed algorithms.

To offer a bird's-eye view on a wide range of algorithms for basic challenges in distributed systems.

To provide students with an algorithmic frame of mind for solving fundamental problems in distributed computing.

Course content
Snapshots, graph traversal, termination detection, garbage collection, deadlock detection, routing, election, minimal spanning trees, anonymous networks, fault tolerance, failure detection, synchronization, consensus, mutual exclusion, self-stabilization.

Characteristic of the course is that correctness arguments and complexity calculations of distributed algorithms are provided in an intuitive fashion.

Form of tuition
4 hours per week HC
4 hours per week WC

Type of assessment
Written examen (plus a take-home exercise sheet that can provide up to 0.5 bonus point).

Course reading
W.J Fokkink. Distributed Algorithms: An Intuitive Approach. MIT Press, 2013.

Target group
mAI, mCS, mPDCS

Remarks
The homepage of the course is at http://www.cs.vu.nl/~tcs/da/

Distributed Systems

Course code	X_400130 (400130)
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	dr. ing. T. Kielmann
Examinator	dr. ing. T. Kielmann
Teaching staff	dr. ing. T. Kielmann
Teaching method(s)	Lecture, Seminar
Level	400

Course objective

After taking this course, students will be able to:

- understand to a large extent the intricacies related to designing and developing a distributed computer system.

- understand the tradeoffs between centralized, distributed, and fully decentralized solutions.

- be capable of successfully studying research papers on (advanced) distributed systems.

Course content
It is difficult to imagine a standalone modern computer system: every such system is one way or the other connected through a communication network with other computer systems. A collection of networked computer systems is generally referred to as a distributed (computer) system. As with any computer system, we expect a distributed system to simply work, and often even behave as if it were a single computer system. In other words, we would generally like to see all the issues related to the fact that data, processes, and control are actually distributed across a network hidden behind well-defined and properly implemented interfaces. Unfortunately, life is not that easy.

As it turns out, distributed systems time and again exhibit emergent behavior that is difficult to understand by simply looking at individual components. In fact, many aspects of a distributed system cannot even be confined to a few components, as is easily seen by just considering security.

In this course, we pay attention to the pillars on which modern distributed systems are built. Unfortunately, these pillars cannot be viewed independently from each other: each one is equally important for understanding why a distributed system behaves the way it does, and depends on the way that other pillars have been constructed. In this sense, pillars form principles, in turn offering a view that one can take when studying distributed systems. We will consider the following principles:

- architectures
- processes
- communication
- naming
- coordination
- consistency and replication
- fault tolerance

These principles will be discussed in the context of a few simplifying concepts that have been used to master the complexity of developing distributed systems: objects, files, documents, and events.

Form of tuition
The course is taught as a series of lectures, in combination with small exercises.

Type of assessment
Written exam.

Course reading

This year, we will use a reader. Details about its distribution will be announced via blackboard in due time.

Entry requirements
Students should have taken a standard course on computer networks. Experience with (distributed) programming will be helpful.

Target group
mCS, mPDCS, mAI

Energy Flow Models

Course code	B_ENERFLOW (900675)
Period	Period 1
Credits	3.0
Language of tuition	English
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. J.J. de Koning
Examinator	dr. J.J. de Koning
Teaching staff	dr. J.J. de Koning
Teaching method(s)	Lecture, Computer lab
Level	500

Course objective
To provide the student with knowledge about energy flow models, and so to enable the student to apply this knowledge in the modelling of human endurance performance.

Course content
Research in which exercise physiology and biomechanics are combined as a 'toolbox' is apparently unique and successful. This course familiarizes the student with one branch of this approach. Energy flow models, based on power equations, will be used to study performance determining factors in endurance sports. This course explains the technique of modelling, how parameter values are obtained from experiments and how simulations with the model can be done. The student will construct a model of an endurance athlete to study the effect of parameter values on performance in cycling, speed skating and running. The models will be made in MATLAB. Knowledge of MATLAB is necessary to be successful in this course.

Form of tuition
Lectures and guided practical;
84 hours (from which 28 practical, 6 lecture, 2 exam and 48 self study).

Type of assessment
Written examination and practical report (30%/70%).

Course reading
A selection of articles and practical guide on Blackboard.

Entry requirements
900104: Biomechanica (Students are expected to have sufficient knowledge of this subject);

900215: Mechanische analyse van het menselijk bewegen (Students are expected to have sufficient knowledge of this subject)

Registration procedure
For more info on workgroups, laboratories, (computer) practicals etc. please see Blackboard.

Entrepreneurship and Innovation, a Relational Perspective

Course code	S_OIRP ()
Period	Period 2
Credits	6.0
Language of tuition	Dutch
Faculty	Faculteit der Sociale Wetenschappen
Coordinator	dr. I.A.M. Wakkee
Examinator	dr. I.A.M. Wakkee
Teaching staff	dr. W.A.M. Borst, I. Borst
Teaching method(s)	Lecture, Study Group
Level	600

Evolutionary Computing

Course code	X_400111 (400111)
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	prof. dr. A.E. Eiben
Examinator	prof. dr. A.E. Eiben
Teaching staff	prof. dr. A.E. Eiben, J.V. Heinerman MSc
Teaching method(s)	Lecture
Level	400

Course objective
To learn about computational methods based on Darwinian principles of evolution. To illustrate the usage of such methods as problem solvers and as simulation, respectively modelling tools.To gain hands-on experience in performing experiments.

Course content
The course is treating various algorithms based on the Darwinian evolution theory. Driven by natural selection (survival of the fittest), an evolution process is being emulated and solutions for a given problem are being "bred". During this course all "dialects" within evolutionary computing are treated (genetic algorithms, evolutiestrategieën, evolutionary programming, genetic programming, and classifier systems). Applications in optimisation, constraint handling, machine learning, and robotics are discussed. Specific subjects handled include:
various genetic structures (representations), selection techniques, sexual and asexual variation operators, (self-)adaptivity. Special

attention is paid to methodological aspects, such as algorithm design and tuning. If time
permits, subjects in Artificial Life will be handled. Hands-on-experience is gained by a
compulsory programming assignment.

Form of tuition
Oral lectures and compulsory programming assignment. Highly motivated students can replace the programming assignment by a special research track under the personal supervision of the lecturer(s).

Type of assessment
Written exam and pogramming assignment (weighted average).

Course reading
Eiben, A.E., Smith, J.E., Introduction to Evolutionary Computing.
Springer, 2003 ISBN 3-540-40184-9.
Slides available from http://www.cs.vu.nl/~gusz/ecbook/ecbook.html .

Target group
mBA, mAI, mCS, mPDCS

Experimental Design and Data Analysis

Course code	X_405078 ()
Period	Period 5
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	dr. E.N. Belitser
Examinator	dr. E.N. Belitser
Teaching staff	dr. E.N. Belitser
Teaching method(s)	Lecture, Practical
Level	400

Course objective
In this course the student is acquainted with the most common experimental designs and regression models. Furthermore, nonparametric tests and bootstrap methods are discussed. On completion of this course the student should be able to:
- design experiments and analyse the results according to the design,
- analyse data using the common ANOVA designs,
- analyse data using linear regression or a generalized linear regression model,
- perform basic nonparametric tests,
- perform bootstrap and permutation tests.

Course content
Regression models try to explain or predict a dependent variable using measured independent variables. Statistical methods are needed if there is random variation in the dependent variables. We will discuss multiple linear regression, analyses of variance (ANOVA), generalized linear regression models. All methods will be illustrated with practical examples. Especially in the case of ANOVA it is necessary that the study is well designed in order to draw sound conclusions from an experiment

or survey. In this course a few well known designs (completely randomized, randomized block etc.) and the associated analyses of variance are discussed. The remainder of the course is be dedicated to non-parametric testing methods and bootstrap methods:
- Wilcoxon test for (one and two samples)
- Kolmogorov-Smirnov test (two samples)
- rank correlation tests
- permutation and bootstrap tests
All analyses are carried out by a computer package, for which we need to know code but no formulas.

Form of tuition
Lectures, computer classes, discussions of the computer assignments.

Type of assessment
Weekly computer assignments and final assignment. The final grade is based on the written reports of all these assignments.

Course reading
- Slides of the lectures,
- R manual,
- assignments.

An introductory book on statistics (containing the prerequisite knowledge for this course) is for example
- Statistical reasoning for everyday life, J.O. Bennett, W. Briggs, M.F. Triola.

For more background on the topics in this course, the following books are recommended:
- Linear models with R, by J.J. Faraway (emphasis on the implementation in R);
- Extending the linear model with R, by J.J. Faraway (emphasis on the implementation in R);
- A first course in the design of experiments; a linear models approach, by D.C. Weber and J.H. Skillings (emphasis on the designs, also implementation in SAS).

Entry requirements
Introductory statistics, e.g. Empirical Methods

Recommended background knowledge
Probability and statistics courses.

Target group
mAI, mCS

Remarks
All assignments are to be solved using the statistical package R (http://www.r-project.org/)

Governance of Security and Policing

Course code	S_GSP ()
Period	Period 2
Credits	6.0
Language of tuition	English

Faculty	Faculteit der Sociale Wetenschappen
Coordinator	prof. dr. M.G.W. den Boer
Examinator	prof. dr. M.G.W. den Boer
Teaching staff	prof. dr. M.G.W. den Boer
Teaching method(s)	Lecture
Level	500

Course objective
In this course, students learn about the most important aspects of the governance of international security at the beginning of the 21st century. They will acquire knowledge of how security governance functions at the international level nowadays, how various levels interact and complement one another, and how this affects traditional notions of security and its governance. Particular attention will be given to international institutions in various contexts, including military interventions and international police cooperation. At the end of the course, students will have an overview of how international authorities and its agents address security challenges nowadays.

Course content
This course (6 ECTS) tries to grasp the complexities of security governance beyond the nation-state in a world with global, regional, and transnational security challenges. Focusing on security issues in the rather narrow sense of military threats and criminal activities, the course will start with problematizing security and security governance. It will then introduce main concepts and institutions in the organization of security governance, and intensively deal with NATO, the European Union, and the United Nations' engagement in security management. This includes a perspective on international policing and its organizations/ regimes, such as Interpol, Europol, or Frontex, which will be investigated with attention to the different (legal) frameworks they operate in. Along these lines, modes and problems of inter-institutional cooperation will play a role, too, in order to get an idea of the complexity of organizing security between agents of different kind, on different levels, and with regard to a variety of issues.
This class is not an International Relations theory class. Some knowledge on IR theories will have to be acquired but also be taught in class. A good introduction is the book by Scott Burchill, Andrew Linklater et al. (2013). Theories of International Relations. 5th edition. Basingstoke and New York: Palgrave Macmillan.

Form of tuition
Interactive lectures and other forms

Type of assessment
Assessment modalities will be announced in class, and possibly include a short essay.

Course reading
Various articles and/or books, to be announced on Blackboard. Maybe, a textbook will be introduced.

Target group
Master students Bestuurskunde & Politicologie.

Remarks
Please bear in mind that this seminar is in English. This means that passive and active command of the English language in reading, writing and speaking is required, particularly in view of the written exam.

Health Promotion and Disease Prevention

Course code	AM_470811 ()
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Coordinator	dr. M.C. Adriaanse
Examinator	dr. M.C. Adriaanse
Teaching staff	dr. M.C. Adriaanse, prof. dr. I.H.M. Steenhuis, dr. W. Kroeze, I.J. Evenhuis MSc
Teaching method(s)	Lecture, Study Group
Level	500

Course objective
1. To provide a solid basis in understanding elementary aspects of the theory, research and practice in the field of health promotion & disease prevention
2. To write a scientific study protocol in English about the planned development and evaluation of a preventive health intervention.

Course content
This course, fits in the program of the specialization Prevention and Public Health. Within this specialization you are trained to become a health promotor who is able to work in a theory- & evidence-based way and is able to link research, practice and policy. The courses within this specialization are structured according to the six steps of Intervention Mapping. These steps are: 1) Needs assessment, 2) Preparing matrices of change objectives, 3) Selecting theory-informed intervention methods and practical applications, 4) Producing program components and materials, 5) Planning program adoption, implementation, and sustainability and 6) Planning for evaluation. The course Health Promotion and Disease Prevention will introduce you to the six steps of Intervention Mapping. Specific emphasize will be put on step 2 and 3 with a focus on primary prevention.

This course focuses on lifestyle/ health behaviors and environmental differences related to health and diseases among individuals and populations. The ultimate goal is to improve peoples' health status and quality of life by health promotion interventions. Some examples of the topics that will be addressed are:
• Intervention mapping; designing theory- and evidence-based health promotion programs.
• Theory-based intervention methods and strategies; theoretical methods that can help to change several of the most important determinants of health behaviors.
• Computer tailoring & e-health: Use of new media provides opportunities and challenges for the implementation of health education interventions
• Environmental influences on health. The physical environment and health interact. The importance of environmental interventions and their

effect on health are postulated.
• Health-related quality of life; the role of perceived mental and physical health status in the development of interventions.
• Effect and process evaluation; principals, perspectives on process evaluation, and determining the effects of health promotion programs.
Core element in this course is writing a study protocol in English, describing the design of a health promoting or disease preventing intervention trial.

Form of tuition
This course is rewarded with 6 ECTs and runs from 29Th September until 24th October 2014. Health Promotion and Disease Prevention is a full-time course, this means that 42 hours a week are necessary to pursuit the goals of this course. Regular attendance during the weeks is mandatory.

Teaching activities include: Lectures, tutorials, guest lecturers, group assignment (study protocol), peer review sessions and self study.

Type of assessment
Grades will be based on the assignment (study protocol) and a written exam that includes multiple choice and open-ended questions. The final grade is being determined by the study protocol (25%) and written exam (75%). The study protocol as well as the written exam must have a grade 5.5 or higher.

Course reading
The following book is required for students who follow the specialization Prevention and Public Health.
Planning Health Promotion Programs: An Intervention Mapping Approach, 3rd Edition, by L. Kay Bartholomew, Guy S. Parcel, Gerjo Kok, Nell H. Gottlieb, Maria E. Fernandez. February 2011, Hardcover (E-book also available). Chapters which are applicable to this course will be announced through BB.

In addition, students will use a course manual, and additional course materials are provided on Blackboard.

Entry requirements
At the start of this course, we expect you to master knowledge, insight, attitude and skills at a level which is comparable to the final qualifications stated by the Bachelor Health Sciences at the VU.

Recommended background knowledge
The following courses of the Bachelor health sciences are strongly recommended: 'Preventie' and 'Gezondheidscommunicatie'.

Target group
Students with a Bachelor degree or pre-masters in Health Sciences with interest in the field of prevention and public health.

Registration procedure
Registration for this course via VU-net. Registration for the assignment in subgroups via Blackboard; obligated 1 week before the start of the course.

Remarks
This course is compulsory within the Master specialization Prevention & public health.

Health Psychology

Course code	AM_470730 ()
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen
Examinator	prof. dr. I.H.M. Steenhuis
Teaching staff	prof. dr. I.H.M. Steenhuis
Teaching method(s)	Lecture, Study Group
Level	400

Course objective
The objective of the course ‘Health Psychology’ is to obtain knowledge and understanding of:
1. coping with diseases;
2. compliance;
3. stigmatization;
4. communication processes between health care workers and their patients;
5. interventions in chronic illness;
6. psychosomatic disorders

Knowledge:
•You can explain what health psychology is;
•You have insight in and can explain the (historical and recent) development of the field of health psychology;
•You can explain what tertiary prevention is;
•You understand and have insight into the fundamental elements of coping, compliance, stigmatization, doctor-patient communication, self-regulation and psychosomatic disorders. You can explain these before mentioned topics in terms of theory and research;
•You have knowledge of intervention programs in health psychology (tertiary prevention) in theory and practice;
•You have knowledge of research in health psychology.

Skills:
•You are able to interpret and apply scientific literature in the field of health psychology;
•You are able to develop a feasible Mhealth intervention plan (mobile app aimed at tertiary prevention) based on intervention mapping steps 1-4 with a specific focus on steps 3 and 4;
•You are able to pitch an idea for a theory-based health psychology intervention (tertiary prevention) in order to bring in funding, in under 10 minutes;
•You are able to pitch in English;
•You can write a short paper in English on the theory regarding a predetermined theme and are able to reflect if and in what way the reality of a guest lecturer (patient) is in accordance with this theory.

Course content
This course, fits in the program of the specialization Prevention and Public Health. Within this specialization you are trained to become a health promoter who is able to work in a theory- & evidence-based way

and is able to link research, practice and policy.
The courses within this specialization are structured according to the six steps of Intervention Mapping. These steps are: 1) Needs assessment, 2) Preparing matrices of change objectives, 3) Selecting theory-informed intervention methods and practical applications, 4) Producing program components and materials, 5) Planning program adoption, implementation, and sustainability and 6) Planning for evaluation

The course Health Psychology will pay special attention to step 3 and 4 of Intervention Mapping with a focus on tertiary prevention.

Health Psychology refers to the psychological aspects of health, illness and the health care system. In the current course 'Health Psychology', six different subjects regarding tertiary prevention, which are relevant in the field of Health Psychology, will be discussed. Psychological aspects which are relevant in treatment of diseases and coping with (chronic) diseases will be studied, as well as the way we can influence these aspects. Questions to be studied will be for example 'How can we improve compliance of patients with diabetes?', and 'How can we improve communication between health care workers and their patients?', and 'How can we diminish stigmatization of HIV-patients?'. These and other questions will be studied in six cases. In all cases, first underlying determinants or psychological processes of the problems have to be studied. Second, interventions to tackle the presented problems or research into the different problems will be studied.

Form of tuition
This course is rewarded with 6 ECTs. Health Psychology is a full-time course, this means that 42 hours a week are necessary to pursuit the goals of this course. Regular attendance during the weeks is mandatory.

Teaching activities include:
Lectures, tutorials, workgroups, patient guest lectures, pitch sessions.

During the course we use blackboard. Here you can find information, e.g. lectures or alterations to the schedule et cetera.

Type of assessment
In order to pass for the course you must:
1.Write a plan for the systematic development of an M-health Intervention (mobile app aimed at tertiary prevention) in which you briefly describe Intervention Mapping steps 1 and 2 and emphasize Intervention Mapping steps 3 and 4. In addition you have to pitch your elaborated intervention plan in order to bring in funding. You will carry out this assignment in couples (pass mark is 5.5);
2.Hand in your PowerPoint slides (or other materials that you used for the presentation);
3.Attend the three guest lectures by patients;
4.Hand in an individually written report about one of the guest lecturers before the end of the course (pass mark is 5.5);
5.Pass the written exam (pass mark is 5.5).

The final mark for the course is being determined by:
•Assignment 1 consisting of the intervention plan and the corresponding pitch (40%);
•The paper about the guest lecture (10%);
•The written exam (50%).

Course reading
The following book is required for students who follow the specialization Prevention and Public Health:

Planning Health Promotion Programs: An Intervention Mapping Approach, 3rd Edition, by L. Kay Bartholomew, Guy S. Parcel, Gerjo Kok, Nell H. Gottlieb, Maria E. Fernandez. February 2011, Hardcover (E-book also available)

Chapters which are applicable to the course Health Psychology will be announced through BB.

Furthermore, we will use the following book during this course:
French, D., Vedhara, K., Kaptein, A.A., & Weinman, J. (2010). Health Psychology. West Sussex: BPS Blackwell.

Other literature will be announced in the course manual.

Entry requirements
At the start of this course, we expect you to master knowledge, insight, attitude and skills at a level which is comparable to the final qualifications stated by the Bachelor Health Sciences at the VU.

Specific entry requirements are:
•Knowledge about Intervention Mapping Protocol
•Knowledge about primary and secondary prevention

Recommended background knowledge
The following course of the Master health sciences is strongly recommended: ‘Health Promotion and Disease Prevention’.

Target group
Master students Health Sciences. All other students need approval of the course coordinator and the examination committee of their own program.

Registration procedure
Registration for this course via VU-net.

History of digital cultures

Course code	X_418107 ()
Period	Period 3
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	O.W. Schrofer
Examinator	O.W. Schrofer
Level	400

Course content
http://studiegids.uva.nl/xmlpages/page/2015-2016/zoek-vak/vak/21188

Remarks
This course is offered at the UvA. For more information contact: FNWI Education Service Centre, Science Park 904, servicedesk-esc-

science@uva.nl, +31 (0)20 525 7100.
Enrolment via https://m.sis.uva.nl/vakaanmelden is required.

Human Information Processing

Course code	P_MHINFOP (815048)
Credits	6.0
Language of tuition	English
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. S.A. Los
Examinator	dr. S.A. Los
Teaching staff	dr. S.A. Los
Teaching method(s)	Lecture
Level	400

Course objective
Introduction to the major theories of human information processing and the experimental methods to test them.

Course content
In this course you will be familiarized with the literature on human information processing, which aims at understanding the functional architecture of processes intervening stimulus and response. Major themes include: (1) serial versus parallel organization of mental processes (2) continuous versus discrete transmission of information between consecutive processes (3) the controversity of the central bottleneck (4) the role of preparation and executive control. These themes are studied from a functional perspective: The focus is on what these processes are supposed to be doing rather than on where in the brain these processes are implemented. The dominant method in this literature is mental chronometry, which aims at making interfences on the basis of latency measures, such as response times and the onset of event- related brain potentials.

Form of tuition
Lectures.

Type of assessment
Written examination with open questions.

Course reading
Journal articles to be specified on Blackboard.

Remarks
As of 2015-16, this course in no longer taught. Students who took this course in 2014-15 but did not conclude it succesfully have two more possibilities to do so in 2015-16. Please contact the coordinator of the course to discuss this if necessary.

ICT4D: Information and communication technology for Development

Course code	X_405101 ()
Period	Period 5
Credits	6.0

Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	dr. K.S. Schlobach
Examinator	dr. K.S. Schlobach
Teaching staff	dr. K.S. Schlobach
Teaching method(s)	Lecture, Seminar
Level	400

Course objective
In the developed world Computers are ubiquitous, and ICT has rapidly grown into a critical asset for economic, technological, scientific and societal progress. The main objectives of this course are:
1) to make the next generation of Computer Scientists aware of:
a) The importance of ICTs for the developing world and the unexpected way developing countries are leapfrogging into the information age
b) The opportunities and challenges that exist for an information scientist in the area of 'development4development'
c) The influence of context in a typical ICT4D project
d) The complexity of deploying an ICT project within a development context, and how to tackle this.
2) to equip the students with some initial project management, technological and programming skills specific to an ICT deployment in a developing country.
Positioned at the heart of the VU's vision of social relevance as one of the guiding principles, the core aim of the course is to raise the awareness that we as Computer Scientists can make a significant difference by sharing our expertise according to well established principles of international development.

Course content
The course will be given jointly by the Department of Computer Science and the Center for International Cooperation, and will consist of 4 modules: two practical ones, and two theoretical ones.
1) Analysing a development problem (CIS): this theoretical module will introduce the analytical methods required for an indepth understanding of a potential development support project. A number of invited speakers will introduce general requirements and strategies, as well as more focused on a particular potential project.
2) Developing a deployment plan (CIS): in this practical module the students will have to produce a specific deployment plan for an ICT project in a developing country.
3) From plan to project (CS): this theoretical module will provide some initial technological knowledge required for running an ICT project in a developing country. It will give an overview over technology already applied, such as specific networks, connection types, hardware as well as specific software environments, but also introduce basic concepts in project management for ICT projects.
4) Turn projects into tools (CS): In this practical module the students will actually build a set of deployment tools according to the conditions specified in their deployment plan, including building the required infrastructure, setting up hardware, writing and installing required software, including appropriate documentation and user guidance.
Depending on current actual collaborations of CIS and the CS department a specific type of deployment will be chosen. Examination will be via 2

projects related to those concrete deployment activities of ICT in the development context

Form of tuition
The course will be a combination of lectures (first 4 weeks) and project work (weeks 5-8).

Course reading
Collection of papers.

Target group
mAI, mCS

Information Retrieval 1

Course code	X_418043 (418043)
Period	Period 3
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Level	500

Course content
The course description is available on:
http://studiegids.uva.nl/xmlpages/page/2015-2016/zoek-vak/vak/17723

Registration procedure
Registration is required via https://www.sis.uva.nl until four weeks before the start of the semester.

Information Visualization

Course code	X_418143 ()
Period	Period 4
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen

Course content
http://studiegids.uva.nl/xmlpages/page/2015-2016/zoek-vak/vak/16960

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

Intelligent Interactive Systems

Course code	X_418023 (418023)
Period	Period 1
Credits	6.0

Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Level	400

Course content
http://studiegids.uva.nl/xmlpages/page/2015-2016/zoek-vak/vak/16967

Target group
mIS

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

Interdisciplinary Research Methodology for IS

Course code	X_405085 ()
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	prof. dr. J.M. Akkermans
Examinator	prof. dr. J.M. Akkermans
Teaching staff	prof. dr. J.M. Akkermans, dr. D. Ceolin
Teaching method(s)	Lecture
Level	500

Course objective
This course helps prepare students for scientific research and particularly their Master research project and thesis.

After completion of the course the student:
• is able to formulate a research design containing appropriate research questions and how they are answered through applicable research methods, the latter covering qualitative, quantitative and constructive methodologies typical to the IS field
• is able to argue for his/her research design with solid argumentation explaining the underlying assumptions, pros and cons etc. of the chosen methods.
• is able to collect and process the research data according to the different IS research methodologies and to critically judge the obtained results in relation to the research questions
• is able to describe and critically discuss the above activities in a written report, and to present and discuss the results to a scientific audience

Course content
The course provides an interdisciplinary overview of and hands-on work with different scientific research methods, with an emphasis on ICT/information systems and technologies in interaction with their human, social and organizational contexts.

Topics are:
• scientific research and its goals, the idea of scientific method, in the context of Information Sciences;
• conceptualizing and framing the research questions you want to answer;
• making a research design and planning your research;
• IS conceptualization, theory formation and validation/triangulation;
• research methods and their assumptions, pros and cons (e.g. interview, observation, case study, field and action research, modelling and simulation, experiment, survey, statistical analysis, IS/ICT artefact system design and development);
• how do you (and others) know that your research results are valid?
• scientific argument, communication and research report writing.

Form of tuition
The focus is on students getting hands-on experience with different research methods applied to open-ended research questions.
The setting of the assignment work is that of a continuing research case investigation that emulates different
stages of a scientific research project.
The research case question to be investigated differs from year to year.
A representative example is: What is it for systems to be considered "smart" (e.g. smart homes, smart city, smart energy, e-health, etc), and how can we solve problems by making (socio-technical) systems "smarter" with the help of ICT technologies and to the benefit of people?
Students receive weekly feedback on their assignments in discussion sessions with staff supervisors, and are able to improve upon them during the course, until the final portfolio has to be handed in at the end of the course.

Type of assessment
Portfolio containing a set of group and individual assignments.
Students receive weekly feedback on their assignments, and are able to improve upon them, until the final portfolio has to be handed in at the end of the course.

Course reading
Textbook: Colin Robson: Real World Research, 3rd Ed., Wiley, 2011 [Note: this book is available in hardcover, paperback and a ditigal edition].
Other sources are made available via Blackboard.

Entry requirements
Basic knowledge of qualitative and quantitative research methods.

Target group
mAI, mIS

Remarks
This course is taught jointly with UvA under the name Interdisciplinary Research Methodology for IS

For UvA, see
http://studiegids.uva.nl/xmlpages/page/2014-2015/zoek-vak/vak/742475

Internet programming

Course code	X_405082 ()
Period	Period 1

Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	dr. S. Voulgaris
Examinator	dr. S. Voulgaris
Teaching staff	dr. S. Voulgaris
Teaching method(s)	Lecture
Level	500

Course objective
Guide the student through the design and development of Network and Web applications.

Course content
The course discusses the principles for understanding, designing, and developing Internet applications. This includes programming the network (sockets, threads, RPC, RMI), programming the web interface (servlets, PHP, Javascript, AJAX), and setting up secure communication channels. Throughout the course, as well as in the context of the lab assignments, attention is paid to practical issues of applying these concepts.

Form of tuition
Lectures combined with lab assignments

Type of assessment
Final exam plus lab assignments

Course reading
Course slides

Entry requirements
Knowledge of C, Java

Recommended background knowledge
Good knowledge of both C and Java

Target group
mAI, mCS, mPDCS

Knowledge and Media

Course code	X_405065 (405065)
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	dr. T. Kuhn MSc
Examinator	dr. T. Kuhn MSc
Teaching staff	prof. dr. A.T. Schreiber, dr. T. Kuhn MSc
Teaching method(s)	Seminar
Level	500

Course objective
The goal of the course is to provide insight in the concepts of information organization,
knowledge, ontologies and knowledge processes in relation to various ICT-based media.

Course content
This course treats the principles and theories that form the foundation of information organization and knowledge-intensive processes in relation to various multi-media
applications. Knowledge processes are those processes that use knowledge (reasoning), document knowledge (representation), acquire knowledge or transfer knowledge (teaching). The relation between knowledge processes and (interactive) media will be explored. Various types of applications will be discussed, such as special purpose search engines, educational systems, serious gaming and mind tools.

Form of tuition
Working lectures

Type of assessment
Portfolio

Course reading
Articles distributed through Blackboard

We will use The Discipline of Organizing Edited by Robert J. Glushko as a text.

Target group
UvA students and optional course for mCS, mAI and mIS

Knowledge Engineering

Course code	X_405099 ()
Period	Period 2+3
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	dr. A.C.M. ten Teije
Examinator	dr. A.C.M. ten Teije
Teaching staff	dr. A.C.M. ten Teije
Teaching method(s)	Lecture
Level	400

Course objective
goals:
1) to be able to elicitate knowledge from experts by using several elicitation techniques
2) to be able to build all CommonKads models that play a role in the development of a knowledge based system, this includes the context of the KBS and the expertise model based
3) to be able to implement the expertise model as a prototype

4) to be able to reflect on your own process of modelling and building a knowledge based system, and to reflect on your product (=which are the models and the implementation)

Course content
Knowledge Engineering is a discipline that involves integrating knowledge into a program for solving a complex problem, which requires human expertise. Typical tasks are classification, diagnosis, planning etc. In the course we use CommonKADS as the methodology for the process of modeling the organisation, the context and the knowledge intensive tasks.
This methodology give clear guidelines and concrete templates for modeling the organisational aspects and the expertise model, which is the core model of knowledge based system. The notion of pattern-based knowledge modeling is a key issue in the knowledge modelling process.
The goal of the final project is to perform the entire knowledge technology process for a knowledge intensive problem of your own choosing, starting with context analysis, up to a (partial) implementation of the knowledge based system.

Form of tuition
Lectures, assignments, group project

Type of assessment
Assignment, project reports.

Course reading
Schreiber, Akkermans, Anjewierden, de Hoog, Shadbolt, van de Velde, Wielinga: Knowledge Engineering & Management. The MIT Press, Cambridge MA, 2000, ISBN 0-262-19300-0.

Target group
mAI, mIS, mCS-TAI

Knowledge Representation on the Web

Course code	X_418169 ()
Period	Period 5
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	dr. K.S. Schlobach
Teaching method(s)	Education

Course content
http://studiegids.uva.nl/xmlpages/page/2015-2016/zoek-vak/vak/1132343

Registration procedure
Registration is required via https://www.sis.uva.nl before the start of the semester.

Large Scale Data Engineering

Course code	X_405116 ()
Period	Period 4

Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	prof. dr. P.A. Boncz
Examinator	prof. dr. P.A. Boncz
Teaching staff	prof. dr. P.A. Boncz
Teaching method(s)	Lecture, Seminar
Level	500

Course objective
The goal of the course is to gain insight into and experience with algorithms and infrastructures for managing big data.

Course content
This course confronts the students with some data management tasks, where the challenge is that the mere size of this data causes naive solutions, and/or solutions that work only on a single machine, to stop being practical. Solving such tasks requires the computer scientist to have insight in the main factors that underlie algorithm performance (access pattern, hardware latency/bandwidth), as well as possess certain skills and experience in managing large-scale computing infrastructure.

Form of tuition
There are two lectures per week, and requires significant practical work. The practicals are done outside lecture hours, at the discretion of the students who are supported remotely through Skype screen sharing.

Type of assessment
In the first assignment the students can work either on their own laptops via a prepared VM, or in the cloud using an Amazon EC2 Micro Instance; and there is an online competition between practicum teams for the best result. The second assignment, using a Hadoop Cluster, are done on the SurfSARA Hadoop cluster (90 machines, 720 cores, 1.2PB storage). For this assignment, a report of 5-8 pages must be written. The students also need to read two scientific papers of choice, related to the second assignment, and present these in class. There is no written examn; the grade is based on the two assignments grades, the grade for the in-class presentation and attendance/participation.

Course reading
scientific papers provided in the course

Entry requirements
Hadoop environments are consist of Linux machines, so some basic ability in working with these comes in handy. Also, you must have some programming skills in C,C++ or Java.

Recommended background knowledge
Programming proficiency in C/C++ or Java

Target group
mCS, mPDCS

Linear System Dynamics

Course code	B_DYNAMICA (900314)
Period	Period 1
Credits	3.0
Language of tuition	Dutch
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. R.J. van Beers
Examinator	dr. R.J. van Beers
Teaching staff	dr. R.J. van Beers
Teaching method(s)	Lecture, Computer lab
Level	300

Logical Verification

Course code	X_400115 (400115)
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	dr. F. van Raamsdonk
Examinator	dr. F. van Raamsdonk
Teaching staff	dr. F. van Raamsdonk
Teaching method(s)	Lecture, Practical
Level	500

Course objective
Introduction to the proof assistant Coq and its type-theoretic foundations.

Course content
A proof-assistant is used to check the correctness of a specification of a program or the proof of a theorem. The course is concerned with the proof-assistant Coq which is based on typed lambda-calculus. In the practical work, we learn to use Coq. One of the exercises is concerned with the correctness proof of the specification of a sorting algorithm, from which a functional program is extracted. In the course, we focus on the Curry-Howard-De Bruijn isomorphism between proofs on the one hand and lambda-terms (which can be seen as functional programs) on the other hand. This is the basis of proof-assistants like Coq. We study various typed lambda calculi and the corresponding logics.

Form of tuition
2 times 2 hours theory class, 2 times 2 hours practical work

Type of assessment
Written exam, obligatory Coq-exercises, obligatory hand-in theory exercises.

Course reading
Course notes

Entry requirements

An introduction course in logic.

Target group
mCS, mAI, mMath, mPDCS

Remarks
The course is taught once every two years, the next opportunity will be in study year 2016-2017

Machine Learning 1

Course code	X_418144 ()
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen

Course content
http://studiegids.uva.nl/xmlpages/page/2015-2016/zoek-vak/vak/15413

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

Master Project

Course code	X_400285 (400285)
Period	Ac. Year (September)
Credits	30.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Teaching method(s)	Lecture
Level	600

Course objective
The Master programme in Artificial Intelligence is a scientific programme that aims to provide the student with the knowledge, experience and insights needed to autonomously carry out his/her professional duties. The programme is designed to prepare the student for further education as scientific researcher (Ph. D. studies) as well as to offer a solid basis for a career in business at an academic level. Moreover, the programme aims at educating the student as to acquire a practical understanding of the position of the field of Artificial Intelligence within a broad scientific, philosophic and social context.

Course content
Each Master AI programme is finished with a master project AI. This; can be an individual project as well as a group project. Information; about projects (incl. internships) can be found on the Internet pages; of the AI divisions. Internships proposed by the student him/herself; need approval in advance from a member of staff, who will also be; involved with supervising the project.

The size of the graduation projects is as such that with adequate; foreknowledge and complete study, the project can be finished within; 6 months.
The student participates in the KIM (Kunstmatige Intelligentie; Meeting). See blackboard KIM.

Form of tuition
The Master Project has always to be supervised by a staff member, in the case of an internship in cooperation with a supervisor in the company. Internships proposed by the student him/herself need approval in advance from a member of staff, who will cooperate with supervising the project.

Type of assessment
The final grade will be based on the quality of the research, the written thesis, the KIM presentations and the participation in the KIM.

Target group
mAI

Remarks
For all rules, assessment criteria, contact persons, and many practical tips for your master project, see the KIM blackboard page (inclusive the "Manual for the Master Project AI") and http://wiki.cs.vu.nl/mp

Master Thesis: Research Project Cognitive Science

Course code	P_MTHRCSC (815067)
Period	Ac. Year (September)
Credits	30.0
Language of tuition	English
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	prof. dr. J.L. Theeuwes
Examinator	prof. dr. J.L. Theeuwes
Level	400

Course objective
To learn how to perform research and report about it. Projects involve basic research, applied research, research concerning modeling, or a combination of these.

Course content
Students participate in a research project concerning Cognitive Science. The Thesis can be done at the department of Cognitive Psychology (FPP), the department of Artificial Intelligence (FEW), an external research organization (for example TNO), a company, or another (foreign) university.
Before starting, a written research plan should be submitted to the head of the department of Cognitive Psychology or the head of the department of Artificial Intelligence. Participation in a research project can only start after approval of the research plan. The research performed by the student forms the basis for the Thesis. The Master Thesis should be written in article style. Students will be supervised by a person from the academic staff of the department of Cognitive Psychology or the department of Artificial Intelligence.

There will be at least one meeting a week between the student and the supervisor.

Type of assessment
The final grade for the Master Thesis will be based on the quality of both the research and the written thesis. Grading will be done by the direct supervisor and the head of the department.
It is required that
students present their research in the form of a talk during a research meeting. Students are also required to attend at least four research meetings at the department of Cognitive Psychology. It is finally required that students participate in the KIM meetings according to the rules as outlined on the web- site of the KIM meetings.

Memory and Memory Disorders

Course code	P_MMEMORY (815102)
Credits	6.0
Language of tuition	English
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. R.J. Godijn
Examinator	dr. R.J. Godijn
Teaching staff	dr. R.J. Godijn
Teaching method(s)	Lecture
Level	400

Course objective
The course aims to give students an overview of memory at the cognitive and neurophysiological level, and to give students the background to interpret memory disorders in patients with brain damage.

Course content
The course focuses on various approaches in the study of human memory and memory disorders. We will discuss working memory, encoding-retrieval interactions, interference and forgetting implicit memory, and the brain substrate of memory. We will also discuss clinical testing of memory, and memory loss after local brain damage, dementia, and other conditions.

Form of tuition
12 two- hour lectures and workshops, assignments and oral presentations.

Type of assessment
Exam, assignments, and presentation.

Course reading
Various papers, to be anounced via Blackboard.

Remarks
This course is taught every two years. It is not taught in 2015-16, but will be taught again in 2016-17.
Students who took the course in 2014-15, but did not pass it, have the right to one resit in 2015-16. Please contact the course coordinator in that case.

Mini-Master Project AI

Course code	X_400428 (400428)
Period	Ac. Year (September)
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	dr. M. Hoogendoorn
Examinator	dr. M. Hoogendoorn
Level	500

Course objective
Gaining deeper insight into a specific topic in AI.

Course content
This course consists of a small project on a specific topic in AI, selected in agreement with your supervisor. The project may have various forms, such as a literature study, the design of a piece of software, or exploring a research question. The results of the project are described in a brief report. To start, students should contact the coordinator of the projects: dr. M. Hoogendoorn (m.hoogendoorn@vu.nl).

Form of tuition
Individual project and written report.

Type of assessment
The end grade is based on both the project and the written report.

Target group
mAI

Remarks
Depending on the interest of the student, a specific topic is selected and an individual supervisor is assigned.

Mobile Systems

Course code	X_418068 ()
Period	Period 4
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Level	400

Course content
http://studiegids.uva.nl/xmlpages/page/2015-2016/zoek-vak/vak/16211

Target group
mIS

Remarks

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

Model-based Intelligent Environments

Course code	X_405056 (405056)
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	dr. M.C.A. Klein
Examinator	dr. M.C.A. Klein
Teaching staff	prof. dr. J. Treur, dr. M.C.A. Klein, dr. T. Bosse
Teaching method(s)	Lecture
Level	500

Course objective
The student will understand different ways in which computerized models can be used in intelligent support systems, and will develop a prototype of such a system based on approaches described in the literature.

Course content
During their bachelor and first year of the master, students have learned to model human processes using different techniques and at different levels of abstraction. In addition, they have learned to use such models for analysis of situations and reasoning about effective support. In this
course, the modeling knowledge will be further deepened and applied to a specific domain or scenario. Scientific literature and applications of model-based reasoning will be studied. The student will develop a prototype of an application based on models relevant for a scenario chosen by the student. By building this prototype, the student shows that he/she masters the modeling approaches and is able to apply this in a specific domain or scenario.

Form of tuition
Lectures and project.

Type of assessment
Assignments.

Course reading
Papers

Recommended background knowledge
Introduction to Modeling and Simulation, Integrative Modeling

Networked Organizations and Communication

Course code	S_NOC ()
Period	Period 2
Credits	6.0

Language of tuition	English
Faculty	Faculteit der Sociale Wetenschappen
Coordinator	dr. I.R. Hellsten
Examinator	dr. I.R. Hellsten
Teaching staff	dr. I.R. Hellsten
Teaching method(s)	Lecture, Practical, Study Group
Level	500

Course objective
Students who have completed the seminar will be able to critically approach, interpret, and compare theories and literature on social networks, semantic networks, and networked organizations. They can write a literature review or about the developing field of networked organizations and communication. Moreover, they can carry out a small-scale research project (in groups) using a software tool ORA/Automap to conduct social and semantic network analysis on text documents, and reflect on the results.

Course content
The seminar Networked Organizations and Communication aims at gaining in-depth insight into networks and network analysis. The seminar begins with an introduction to network theory, general terms, and concepts. On the basis of recent network literature, the seminar then focuses on how organizations and organizational members become more connected to each other (e.g., through actor similarity, communication patterns, etc.). A particular focus will thus be on gaining insights into social and semantic networks and on the software program with which one can analyze and visualize social or semantic networks. This course addresses three aspects of organizational networks: structure, content and meaning.

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

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

Course reading
Series of articles to be announced on Blackboard.

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

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

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

Neural Models of Cognitive Processes

Course code	P_MNEUMOD (815051)
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. W. Kruijne
Examinator	dr. W. Kruijne
Teaching staff	dr. W. Kruijne
Teaching method(s)	Lecture
Level	400

Course objective
Computational models are an important feature in cognitive neuroscience. When used appropriately, they allow for the integration of findings from a wide range of experiments, as well as detailed predictions. As opposed to many theories, they are rich in detail and allow for a mechanistic view on how the brain operates.

In this course, you will:
-> Learn about how models can enrich the field of cognitive neuroscience
-> Gain insight into different types of models, their strengths and weaknesses
-> Obtain in-depth knowledge about several specific models
-> Get hands-on experience with a variety of models

Course content
The course starts with a general introduction on models within the field of cognitive neuroscience, and getting familiar with the software used in the practical sessions. Then, you will learn about some prototypical neural models, and their applications within (and beyond) your field. The practical sessions will have you explore the inner workings of these models, by means of exercises and essay questions.

In the second half of the course, you will learn about a wider variety of models, with different levels of abstraction. Furthermore, you will dive into (and present) articles where models, inspired by the prototypical ones discussed in the lectures, have been applied in cognitive neuroscience.

Form of tuition
Lectures and discussion, computer tutorial and practicals, one oral presentation.

Type of assessment
Grades are based on a weighted average of performance on a final exam, the oral presentation and the practical sessions.

Course reading
articles, tutorials and other reading material on blackboard

Remarks
This course is taught every two years. It is taught in 2015-16, but not in 2016-17.

Neural Networks

Course code	X_400132 (400132)
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	dr. M. Hoogendoorn
Examinator	dr. M. Hoogendoorn
Teaching staff	dr. M. Hoogendoorn
Teaching method(s)	Lecture, Practical
Level	500

Course objective
The course provides an introduction to key concepts and algorithms for pattern recognition and neural networks. It strives towards providing insight both from a theoretical perspective as well as more practical settings. In the end, the student should be able to confidently apply the aforementioned techniques in real-life settings and understand their theoretical basis.

Course content
The course provides an introduction to key concepts and algorithms for pattern recognition and neural networks. It covers the following topics:

- classification, regression, and clustering problems,
- elements of statistical pattern recognition,
- methods for estimation of probability distributions,
- linear classifiers, including Support Vector Machines,
- single-layer and multi-layer networks,
- RBF-networks and kernel methods
- methods for dimensionality reduction
- methods for feature extraction and selection

Moreover, several real-life applications of pattern recognition, including recognition of speech, handwritten characters, images, etc., will be discussed in depth.

Form of tuition
Lectures (h) and practical (pra).

Type of assessment
Practical assignments and written examination. Both count for 50% of the final grade and both grades should be sufficient in order to pass the course.

Course reading
Simon Haykin, Neural Networks and Learning Machines, Pearson Education, 3rd international edition, 2008

Target group
mAI mBio, mBA, mCS

Remarks
More information will be available via Blackboard.

Perception for Action

Course code	B_PERCACTION (900810)
Period	Period 4
Credits	3.0
Language of tuition	English
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	prof. dr. J.B.J. Smeets
Examinator	prof. dr. J.B.J. Smeets
Teaching staff	prof. dr. J.B.J. Smeets
Teaching method(s)	Lecture, Computer lab
Level	500

Course objective
The student is able to:
- describe the functioning of the sensory systems relevant for motor control;
- interpret scientific literature in the area of perception and apply it to the field of motor control.

Course content

The topic of this course is the question: how is sensory information processed to guide ones action? More specific: how do we know where a target and (a part of) our body is? The answers to these questions require knowledge about the sensory organs, their signals, and how these signals are processed and combined in order to be used to control our actions. Each topic (e.g. proprioception, binocular vision) is introduced by a lecture, but he focus of the course is on the discussion of papers of the last decade The discussion will be about both the phenomenology and the mechanisms.

Form of tuition
Amount of contact hours:
Lectures (‘hoorcolleges’) 7
Tutorials (‘werkcolleges’) 7
Assignments & self study 68
Practicals 2

Each meeting will be a combination of tutorial consisting of a discussion of the previous assignment (1 hour), and a lecture introducing to the topic of the next assignment (1 hour)

In the practical, the students will compare two psychophysical techniques and discuss their effectiveness in answering the question what perceptual information is available.

Type of assessment

After each lecture, students receive an assignment. Six of them have to be handed in before the next meeting. These assignments are graded, and count for 10 % of the final grade. The assignment after the final lecture will contribute 35 %: the remaining 5% on completion of the practical.

Course reading
Literature needed for the course will be distributed during the course.

Entry requirements
No entry requirements. Basic knowledge of the nervous system is expected (e. g. function of various brain areas).

Remarks
- The maximum number of participants in this course is limited to 40

Physical Security and Crisis Management

Course code	S_FVC ()
Period	Period 4
Credits	6.0
Language of tuition	Dutch
Faculty	Faculteit der Sociale Wetenschappen
Coordinator	dr. mr. W.J. Kortleven
Examinator	dr. mr. W.J. Kortleven
Teaching staff	dr. J.J. Wolbers, dr. mr. W.J. Kortleven, D.F. Passenier MSc
Teaching method(s)	Lecture, Study Group
Level	500

Policy and Management

Course code	S_BLM ()
Period	Period 1
Credits	6.0
Language of tuition	Dutch
Faculty	Faculteit der Sociale Wetenschappen
Examinator	dr. D.B.D. Bannink
Teaching staff	dr. mr. A.J.G.M. van Montfort, dr. D.B.D. Bannink, R.J. van Putten MA MSc.
Teaching method(s)	Lecture, Study Group

Prevention of Mental Health Problems

Course code	AM_470840 ()
Period	Period 3
Credits	6.0
Language of tuition	English
Faculty	Fac. der Aard- en Levenswetenschappen

Coordinator	M.J. Bouwman MSc
Examinator	M.J. Bouwman MSc
Teaching staff	prof. dr. W.J.M.J. Cuijpers
Teaching method(s)	Lecture, Study Group, Computer lab
Level	400

Course objective
Knowledge and insight
• Student will have knowledge and insight on the most important theoretical insights and concepts in the field of preventing mental health problems.
• Students will be up to date with knowledge on relevant prevention effectiveness studies.
• Students will be familiar with different mental illness prevention techniques used in clinical practice.
• Students will have know-how on how to plan for and evaluate the effects of mental illness prevention studies.

Skills
• Students will be able to mention and describe the most important theoretical and scientific concepts about the prevention of mental health problems.
• Students will be able to use the acquired theoretical and scientific knowledge to evaluate existing literature on prevention programs.
• Students will be able to use existing literature on a self-chosen problem to discuss its current state of affairs and construct concrete recommendations as to how preventive mental healthcare can be improved on this topic.

Attitude
• Students will be aware of the societal relevance of prevention programs and their positions within their own discipline of study.
• Students will grasp the interdisciplinary character of prevention programs.
• Students will understand the most important obstacles in implementing mental illness prevention programs.
• Students will understand the relevance of research and funding in this field.

Course content
For Health Science students this course fits in the program of the specialization Prevention and Public Health. Within this specialization you are trained to become a health promotor who is able to work in a theory- & evidence-based way and is able to link research, practice and policy.
The courses within this specialization are structured according to the six steps of Intervention Mapping. These steps are: 1) Needs assessment, 2) Preparing matrices of change objectives, 3) Selecting theory-informed intervention methods and practical applications, 4) Producing program components and materials, 5) Planning program adoption, implementation, and sustainability and 6) Planning for evaluation.

For Psychology students this fits in the program of the Clinical Psychology specialization. Within this specialization you are trained to become a psychologist specializing in either the research, policy or practice of mental health care. Most courses in this specialization can be freely chosen and are all specific subtopics in mental healthcare,

usually aimed at specific disorders or types of treatment.

The course Prevention of Mental Health Problems will pay special attention to step 3 through 6 of Intervention Mapping with a focus on mental health.

Theoretical backgrounds of the prevention of mental health problems will be discussed, as well as currently used methods in preventive mental health care. Guest lecturers who work in the field of preventive mental health care will discuss current programs aimed at preventing several psychological symptoms and disorders. Also, the most important results of research conducted in the field of preventive mental health care will be presented. There will also be a focus on the implementation and evaluation of mental illness prevention programs.

In the practicals students will tackle a self-chosen problem within the field of preventive mental healthcare, writing a report on it and presenting their most important recommendations.

Because this is an interdisciplinary course and students from several Master tracks are welcome to follow this course, we provide quick ‘crash courses’ in the topics of prevention and psychopathology with additional literature to get students up to speed on the discipline they are not yet familiar with.

All lectures and work group meetings will be taught in English. All examination will be done in English as well.

Form of tuition
This course is rewarded with 6 ECTs and runs from January 6 to January 30 2015.

Prevention of Mental Health Problems is a full-time course, this means that 42 hours a week are necessary to pursuit the goals of this course. Regular attendance during the weeks is mandatory.

Teaching activities include: lectures, work group meetings, consultation hours, feedback on assignments, answers to questions via the Discussion forum on BB.

Type of assessment
An individual written examination that counts for 60% of the final grade of this course.

A written assignment conducted in couples that counts for 30% of the final grade of this course.

A presentation on the written assignment conducted in couples, but graded individually, that counts for 10% of the final grade of this course.

To pass this course you have to have at least a 5.5 for both the individual exam, the presentation and the assignment.

Course reading
The following book is required for students who follow the specialization Prevention and Public Health:

Planning Health Promotion Programs: An Intervention Mapping Approach,

3rd Edition, by L. Kay Bartholomew, Guy S. Parcel, Gerjo Kok, Nell H. Gottlieb, Maria E. Fernandez. February 2011, Hardcover (E-book also available)

Chapters which are applicable to this course will be announced through BB.

For Clinical Psychology and Artificial Intelligence students we will try to find a solution to only make the relevant chapters available.

Other literature will be provided through BB or as a reader. Some examples of literature which are relevant for this course are:

• Beekman, A.T.F., Smit, F., Stek, M.L., Reynolds, C.F., & Cuijpers, P.C.
(2010). Preventing depression in high-risk groups. Current Opinion in Psychiatry, 23(1), 8–11. doi: 10.1097/YCO.0b013e328333e17f
• Holmes E.A., James E.L., Kilford E.J., & Deeprose, C. (2012). Key Steps in Developing a Cognitive Vaccine against Traumatic Flashbacks: Visuospatial Tetris versus Verbal Pub Quiz. PLoS ONE 7(11). doi: 10.1371/annotation/eba0a0c8-df20-496b-a184-29e30b8d74d0
• Koning, I.M., Vollebergh, W.A.M., Smit, F., Verdurmen, J.E.E., van den Eijnden, R.J.J.M., ter Bogt, T.F. M. et al. (2009). Preventing heavy alcohol use in adolescents (PAS): cluster randomized trial of a parent and student
intervention offered separately and simultaneously. Addiction 104, 1669-1678. doi:10.1111/j.1360-0443.2009.02677.x

Entry requirements
At the start of this course, we expect you to have mastered knowledge, insight, attitude and skills at a level which is comparable to the final qualifications stated by the Bachelor of either Health Sciences, Psychology or Artificial Intelligence at the VU.

Recommended background knowledge
• Basic knowledge of psychopathology (symptoms of the most common psychiatric disorders).
• Basic knowledge on what prevention programs are and how they are Developed

Target group
Health Science, Psychology and AI students.

Remarks
Registration for this course via VU-net.

Psychology of Effective Gaming

Course code	X_418145 ()
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	O.W. Schrofer
Examinator	O.W. Schrofer

Course content
http://studiegids.uva.nl/xmlpages/page/2015-2016/zoek-vak/vak/22465

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

Review Paper

Course code	P_MREVPAP (815104)
Period	Ac. Year (September)
Credits	6.0
Language of tuition	English
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. W. Donk
Examinator	dr. W. Donk
Level	500

Course objective
To write a current literature review that covers an open issue in clinical or cognitive (neuro)psychology.

Course content
The review paper is a literature review written by the student under supervision of a member of the department of Clinical Neuropsychology or the department of Cognitive Psychology. Students may write a review on the basis of a self-selected topic provided that they find a member of the department willing to supervise the writing of the paper.
The topic must be narrow enough for the students to cover the literature within the designed period, but must be broad enough so that something is gained from writing a review, and must be of current interest in the literature.
-The review must be written at such level that it could be published in an academic journal

Form of tuition
Students will be individually monitored and instructed by their supervisor in writing a literature review.
Further guidelines are given on the blackboard site 'Master Thesis Cognitive Neuropsychology'

Type of assessment
The literature review is evaluated on the basis of the quality of paper and is graded by the supervisor.

Course reading
Depends on the topic of research.

Remarks
The supervisor for the review paper cannot also be a thesis supervisor.
The topic of the review may not be the same as the topic of the review written in PSR.

Security and Citizenship

Course code	S_VB ()
Period	Period 2
Credits	6.0
Language of tuition	Dutch
Faculty	Faculteit der Sociale Wetenschappen
Coordinator	dr. R. van Steden
Examinator	dr. R. van Steden
Teaching staff	dr. R. van Steden, prof. dr. J.C.J. Boutellier
Teaching method(s)	Lecture, Study Group
Level	500

Seminar Attention

Course code	P_MSEMATT (815100)
Period	Period 5
Credits	6.0
Language of tuition	English
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. R.J. Godijn
Examinator	dr. R.J. Godijn
Teaching staff	prof. dr. J.L. Theeuwes
Teaching method(s)	Lecture
Level	400

Course objective
To learn how to interpret and analyze theories and findings on attention and eye-movements. Learn how to set up experiments. Learn how to present and to write an essay.

Course content
The format of the seminar will be a discussion of one or two target articles, and student presentations, each week. Target articles for each week will be "classic" articles representing early and/or important studies on a specific topic or recent new papers in attention and eye movements. For the presentations, each student has to present the main findings of the target article for that week and is required to find a recent paper on the topic covered by the target article. Students have to prepare a 20 minute oral presentation in Microsoft Powerpoint. The rest of the class will be spent discussing the target articles and their relationship to the presented papers. Each student will give two presentations. The presentation will determine 30% of the course grade for each student. The target papers will be available on the course website and accessible via blackboard. One week after the last class, each student will submit a final paper (up to 8 pages, 12 pt. font, double spaced) on one of the topics covered in class. The paper will consist of a brief review of (at least) 6 research papers (including those already covered on that topic in class) and a proposal for a new experiment. The paper will be worth 40%. Each class all students have to

turn in a sheet of paper with a short question/remark about one of the papers discussed during that class (30% of the grade). Students will receive an introduction into the arts of oral presenting and of writing an essay as a preparation to the assignments.

Form of tuition
Lectures and practical assignments.

Type of assessment
Student presentation (30%), and writing a paper (40%) and sheet of paper with a short question/remark about one of the papers discussed (30%). Students are required to be present during all meetings. Attending the class is required.

Course reading
Articles.

Seminar Cognitive Neuroscience

Course code	P_MSEMCNS (815098)
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. A.V. Belopolskiy
Examinator	dr. A.V. Belopolskiy
Teaching staff	dr. A.V. Belopolskiy
Teaching method(s)	Lecture
Level	500

Course objective
To extend students' knowledge in the field of cognitive and clinical neuroscience.

Course content
Over the last two decennia, scientific research in the field of cognitive neuroscience has led to fundamental new insights in the relation between brain function and behavior. Research is ongoing, and in many cases, the latest insights have not yet traversed their ways down into the regular textbooks. This seminar offers students the possibility to discuss state of the art research. The latest insights into topics such as working memory, multisensory perception, and the mirror neuron system will be covered. The seminar will also cover important questions regarding legal and ethical aspects of cognitive and clinical neuroscience research.

Form of tuition
Lectures, literature study, oral presentations and discussions.

Type of assessment
Oral presentation, contribution to discussion, and a review paper.

Course reading
Research papers to be announced.

Remarks
The requirement to participate is the completion of the basic Cognitive Neuroscience and Neuropsychology course. Alternatively, students may study the required literature by self- study. You need to contact the professor of Seminar Cognitive Neuroscience beforehand. Before you can enter the Seminar, you will need to pass an oral exam with the professor. Note that it is your own responsibility to contact the professor, study the literature and make an appointment for the oral exam.

Serious Games

Course code	X_405097 ()
Period	Period 5
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	prof. dr. A.P.W. Eliens
Examinator	prof. dr. A.P.W. Eliens
Teaching staff	prof. dr. A.P.W. Eliens
Teaching method(s)	Lecture
Level	400

Course objective
Serious games are more and more considered to be an effective means to bring about awareness, acquire skills, change behavior, and influence social patterns. With elementary game development technology, the students will explore the potential of serious games in a social context, using casual game mechanics, and what recently has been identified as the dynamics of gamification.

Course content
The course will cover the following topics:
* an introduction to game design
* practical skills in game development
* game mechanics and scoring mechanisms
* elementary game and utility theory
* media & communication theory
* game interaction patterns
* practical applications of serious games
Students are required to work in teams of 2-4 people, with as a goal the actual development of a serious game, with social network support.

Form of tuition
lectures and practicum

Type of assessment
essay and practicum assignment(s)

Course reading
online reference material(s)

Recommended background knowledge

preferably, but not obligatory, project interactive multimedia and multimedia authoring

Target group
choice for master students CS, IS, and others, with an interest in multimedia and game development

Remarks
For information and registration, see: www.cs.vu.nl/~eliens/serious

Service Oriented Design

Course code	X_405061 (405061)
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	prof. dr. P. Lago
Examinator	prof. dr. P. Lago
Teaching staff	prof. dr. P. Lago
Teaching method(s)	Lecture, Seminar
Level	400

Course objective
Learn advanced design techniques applicable to large service-oriented software systems. Be able to select among them and apply them for a specific system. Be able to reason about and assess the design decisions.

Course content
The lectures explain the concepts related to the Service Orientation software paradigm and Service Oriented Architecture (SOA).
The lectures provide the students with knowledge about how to identify the requirements for a service-oriented software system, how to map them on business services and transform them into complex networks of software services. Special emphasis is given to the design reasoning techniques for crucial decision making, service identification, SOA design and migration. Each year experts from academia and industry are invited to give guest lectures.

The students participate in small teams to piecemeal develop understanding of various service-oriented aspects, and work on an assigned SOA design project.

Form of tuition
Lectures and group work.

Type of assessment
Written reports of the assignments. Teamwork.

Course reading
Material handed out by the lecturer and on Blackboard.

Recommended background knowledge

Software modeling experience (knowledge of UML and SoaML preferred).
Programming.

Target group
mAI, mCS, mIS

Remarks
Registration for this course is compulsory four weeks prior to the start. Further information on this module will be made available on the Blackboard system http://bb.vu.nl.

Software Architecture

Course code	X_400170 (400170)
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	prof. dr. P. Lago
Examinator	prof. dr. P. Lago
Teaching method(s)	Lecture
Level	400

Course objective
Get acquainted with the field of software and information architecture. Understand the drivers behind architectural decisions. Be able to develop and reason about an architecture of a non-trivial software system.

Course content
Students work in groups to develop an architecture for a fictitious system. They have to develop different representations (called views) of the architecture. These different representations emphasize different concerns of people that have a stake in the system. Each group will also be asked to assess ("test") the architecture of another group for certain quality attributes.

Form of tuition
Group work with a number of assignments.

Type of assessment
Project work. Written exam

Course reading
Len Bass et al, Software Architecture in Practice, 3rd Edition, 2012

Target group
mCS, mIS

Registration procedure
Registration is compulsory at least 4 weeks before course starts.

Software Testing

Course code	X_400439 (400439)
Period	Period 5
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	dr. N. Silvis-Cividjian
Examinator	dr. N. Silvis-Cividjian
Teaching staff	dr. N. Silvis-Cividjian
Teaching method(s)	Lecture, Practical
Level	400

Course objective
- Familiarization with basic terminology in software testing.
- Familiarization with techniques and tools used for test generation, execution and adequacy measument.
- Familiarization with software testing literature in a specific area by independent reading of selected research publications.

Course content
Testing is a method to improve software quality. Realistically, software testing is a trade-off between budget, time and quality. It is impossible to test everything so choices have to be made. Students learn how to make these choices and systematically test a software product based only on its requirements or when the code is also available.
This course provides an introduction to software testing with an emphasis on technical activities like test generation, selection, execution and assessment. The course tries to answer a few questions like: How to design test cases? When to stop testing? What to test when a new version of the product is ready? How to test a safety critical software? How to predict how many faults are in a program? During their practical assignments the students have to test small and large object-oriented software using the techniques learned in class and a set of testing tools.
A few guest lectures showing examples of testing in industry are also planned.

Topics: boundary value analysis, equivalence partitioning, model based test generation, control-flow testing, data-flow testing, mutation testing, regression testing, inspections, automated testing.

Form of tuition
Lectures and compulsory homework assignments.

Type of assessment
Practical assignments and written exam.

Course reading
A. Mathur, Foundations of software testing, Pearson Education, Addison-Wesley, 2008, *ISBN: * 978-8131716601

Recommended background knowledge
Programming skills in Java

Target group
mCS, mAI

Remarks
All material is available in Blackboard.

Spatial Criminology

Course code	R_SpaCrim (212416)
Period	Period 5
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Rechtsgeleerdheid
Coordinator	dr. J.J. van der Kemp
Examinator	dr. J.J. van der Kemp
Teaching method(s)	Seminar
Level	600

Course objective
(1) Students acquire knowledge of the latest theories and studies on the spatial distribution of crime;
(2) Student are able to perform basic spatial criminological analyses as well as create crime maps using freeware software like QGIS and CrimeStat;
(3) Students are able to interpret and discuss results from spatial analyses.

Course content
In this course the basic principles of Crime Mapping using a geographic information system (GIS) and spatial analyses are taught.
Mapping where crime takes place is the first step of the analysis of spatial distribution of crime. The relationship between theories and methods of
spatial analysis are discussed. For example, assuming that the spatial distribution of crime is associated with social cohesion.
How this can be investigated and with which methods of spatial analysis can be used in this section is discussed.
A number of different analytical methods are taught and practiced by assignments during the labs and during the final research project on a spatial crime problem.

Form of tuition
As this course is mostly practice based (i.e. a lab course), attendance is of importance.

Type of assessment
To be announced

Course reading
Literature is made available.

Recommended background knowledge
Students should have basic knowledge of research methods and quantitative statistical analyses.

Target group
Apart from regular students, the course is also available for:
Students from other universities/faculties
Contractor (students who pay for one course)

Registration procedure
Only a maximum amount of students may register for the course. Ifthe course is full, no more extra places will be made available.

Remarks
This course requires you to bring your own laptop.

Technology for Games

Course code	X_418146 ()
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen

Course content
http://studiegids.uva.nl/xmlpages/page/2015-2016/zoek-vak/vak/22576

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

The Social Web

Course code	X_405086 ()
Period	Period 4
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	dr. D. Ceolin
Examinator	dr. D. Ceolin
Teaching staff	dr. L.M. Aroyo, V. Maccatrozzo MSc
Teaching method(s)	Lecture
Level	400

Course objective
In this course the students will learn theory and methods concerning communication and interaction in a Web context. The focus is on distributed user data and devices in the context of the Social Web.

Course content
This course will cover theory, methods and techniques for:

- personalization for Web applications
- Web user & context modelling

- user-generated content and metadata
- multi-device interaction
- usage of social-web data

Form of tuition
- lectures
- practical sessions
- assignments including final paper

Type of assessment
Weighted average of assignments and final paper

Course reading
- course lecture slides
- selected articles, videos and Web links for each lecture

Target group
VU: mIS
UvA: master Information Studies - Human-Centered Multimedia
mCS
mAI

Thinking and Deciding

Course code	P_MTHIDEC (815049)
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Gedrags- en Bewegingswetensch.
Coordinator	dr. M. Meeter
Examinator	dr. M. Meeter
Teaching method(s)	Lecture
Level	400

Course objective
Students will learn to understand different theories, research methods and practical aspects about human judgment, rational thinking, perceptual and value-based choices.

Course content
How do we make decisions? Are we rational? Why not? And why do we tend to choose one option of another? How do we process information and choose a specific action accordingly? Are psychological and/or neuroscientific methods able to answer these questions?
In this course students will learn to think about these topics, and place them into a scientific framework. Psychological, economic perspectives will be discussed as well as the underlying neuronal processes that might give rise to particular choice behavior.

Form of tuition
Lectures, literature study, oral presentations & discussion by students.

Type of assessment
1) Oral presentation & discussion, 2) a mini-quiz per class (two short questions about the literature), and 3) writing a review paper.

Course reading
A selection of articles.

Watson Innovation

Course code	X_405129 ()
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	dr. L.M. Aroyo
Examinator	dr. L.M. Aroyo
Teaching staff	dr. L.M. Aroyo, A. Dumitrache MSc, B.F.L. Timmermans MSc
Teaching method(s)	Lecture
Level	400

Course objective
The Watson Innovation course is a collaboration between VU Amsterdam and IBM. In this course you will learn the basics and challenges of Cognitive Computing and how to train Cognitive Computing Systems. You will have the unique opportunity to work with multidisciplinary teams on real prototypes of IBM Watson, and explore its potential for answering questions about the city of Amsterdam. You will also have a chance to showcase developed applications and plans to real clients.

Course content
- Basics of Cognitive Computing & IBM Watson
- How to train IBM Watson Instance
- Develop ideas for Cognitive Computing apps
- Build real IBM Watson prototype apps
- Showcase your ideas to real clients

Form of tuition
Lectures & practical sessions at locations of the VU Amsterdam and IBM Netherlands.

Type of assessment
Evaluation of group projects and individual peer-reviews

Course reading
Course lecture slides and related articles:
- What is IBM Watson? (http://www.ibm.com/smarterplanet/us/en/ibmwatson/what-is-watson.html)
- Building Watson: An overview of the DeepQA project (http://www.aaai.org/ojs/index.php/aimagazine/article/download/2303/2165)
- CrowdTruth papers (http://crowdtruth.org/papers/)

Target group
A balanced mix of Computer Science and Business & Economics students (from VU as well as UvA) in their bachelor or master level.

Registration procedure
Sign up through VUnet and http://crowdtruth.org/course.
For more information contact b.timmermans@vu.nl.

Places are limited, so sign up as soon as possible.

Remarks
There will be no lectures through the Christmas period. The period from 18 December till 10 January is reserved for students individual and group work. Office hours will be provided for additional feedback and questions.