Onderwijs- en examenregeling

Master's programme in Artificial Intelligence
Deel B:
Opleidingsspecifiek deel
Studiejaar 2015-2016

Teaching and Examination Regulations

Master's programme in Artificial Intelligence
Part B:
Programme-specific section
Academic year 2015-2016

VU VRIJE UNIVERSITEIT AMSTERDAM

Deel B: opleidingsspecifiek deel
1. Algemene bepalingen
Artikel 1.1 Gegevens opleiding
1. De opleiding Artificial Intelligence, CROHO nummer 66981 wordt in voltijdse vorm verzorgd, en in het Engels uitgevoerd.
2. De opleiding heeft een omvang van 120 EC.
3. Binnen de opleiding kan de student kiezen uit de volgende specialisaties
   a. IDS: Intelligent Systems Design
   b. DS: Data Science
   c. CogSci: Cognitive Science
   d. HA: Human Ambience

Artikel 1.2 Instroommoment
De opleiding wordt aangeboden met ingang van het eerste semester van een studiejaar (1 september)

2. Programme objectives and exit qualifications
Artikel 2.1 Programme 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 to educate the student to acquire a practical understanding of the position of the field of Artificial Intelligence within a broad scientific, philosophical and societal context.

Students who want to take the Master's programme in Artificial Intelligence are expected to possess basic knowledge and skills in the field at Bachelor's level, including skills and attitudes of a general academic nature. The aim of the Master's programme is to extend and enhance the knowledge and skills acquired at Bachelor's level and, by concentrating on a specific area within the field of Artificial Intelligence, to lead the student towards the frontiers of design and application or towards some of the major research issues in his/her chosen specialization.

Artikel 2.2 Exit qualifications
A graduate with a Master Diploma in Artificial Intelligence:
- Has solid academic knowledge and a clear understanding of the field of Artificial Intelligence (including the required background knowledge from other disciplines) which builds upon and goes beyond the level of a Bachelor's degree in Artificial Intelligence.
- Has knowledge, insight and skills of a specialist nature in at least one specialized field of Artificial Intelligence (for additional requirements, see each specialization separately).
- Is able to acquire specialist knowledge, insights and skills in other areas in of Artificial Intelligence within a reasonable period of time.

Part B: Programme-specific section
1. General provisions
Article 1.1 Programme details
1. The programme in Artificial Intelligence (CROHO number 66981) is a full-time programme taught in English.
2. The programme consists of 120 credits.
3. Students on the programme can choose from the following specializations:
   a. IDS: Intelligent Systems Design
   b. DS: Data Science
   c. CogSci: Cognitive Science
   d. HA: Human Ambience

Article 1.2 Start date
The programme starts each year in the autumn (1 September).

2. Programme objectives and exit qualifications
Article 2.1 Programme objective
The Master's 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 a scientific researcher (PhD studies) as well as to offer a solid basis for a career in business at an academic level. Moreover, the programme aims to educate the student to acquire a practical understanding of the position of the field of Artificial Intelligence within a broad scientific, philosophical and societal context.

Students who want to take the Master's programme in Artificial Intelligence are expected to possess basic knowledge and skills in the field at Bachelor's level, including skills and attitudes of a general academic nature. The aim of the Master's programme is to extend and enhance the knowledge and skills acquired at Bachelor's level and, by concentrating on a specific area within the field of Artificial Intelligence, to lead the student towards the frontiers of design and application or towards some of the major research issues in his/her chosen specialization.

Article 2.2 Exit qualifications
A graduate of the Master's programme in Artificial Intelligence:
- Has solid academic knowledge and a clear understanding of the field of Artificial Intelligence (including the required background knowledge from other disciplines) which builds upon and goes beyond the level of a Bachelor's degree in Artificial Intelligence.
- Has knowledge, insight and skills of a specialist nature in at least one specialized field of Artificial Intelligence (for additional requirements, see each specialization separately).
- Is able to acquire specialist knowledge, insights and skills in other areas in of Artificial Intelligence within a reasonable period of time.

- Has acquired practical skills in relevant sub-areas of the field of Artificial Intelligence at an academic level.
- Is aware of the applications of Artificial Intelligence in general and of his/her chosen specialization in particular and is able to apply his/her knowledge and skills to new or otherwise unknown problems.
- Is capable of designing a project plan on the basis of a realistic problem description in the field of Artificial Intelligence, and of providing original solutions to contribute to its progress.
- Is able to consult and use the (international) professional literature in the relevant sub-areas of Artificial Intelligence.
- Is able to analyse and evaluate scientific results, and to use them to draw conclusions.
- Is able to operate in professional situations where scientific knowledge and skills in Artificial Intelligence are required.
- Has developed a critical, scientific attitude and is aware of the societal aspects of Artificial Intelligence.
- Is able to communicate with others at a professional level and to give clear oral and written presentations of the results of his/her work.
- Is well prepared for a scientific education at the level of Ph.D. or for further postacademic education as a professional computer scientist.

The Master's programme in Artificial Intelligence is divided into a number of specializations. Each of these specializations has its own specific set of requirements, on top of the general requirements listed above.
Prior to describing the specific requirements for each of the specializations, they are briefly listed below.

ISD: Intelligent Systems Design
DS: Data Science
CogSci: Cognitive Science
HA: Human Ambience

Beyond the general final attainment levels for an AI graduate listed above, the graduate of the Intelligent Systems Design specialization:
- ISD-1. is able to apply knowledge acquisition, modelling and management methods;
- ISD-2. has an overview of the literature and practice in the area of organization dynamics and self-organization;
- ISD-3. has mastered methods and techniques for modelling various types of organizations and their dynamics (e.g. for simulation and experimentation);
- ISD-4. is able to methodically design AI systems;
- ISD-5. is capable of conducting application-directed AI research in combination with other fields of research.

Beyond the general final attainment levels for an AI

graduate listed above, the graduate of the Data Science specialization:

- DS-1. has an overview of the literature and practice in the area of Data Science;
- DS-2. understands the full cycle of Data Science from data acquisition and management to analysis and visualization;
- DS-3. has knowledge of which methods and techniques can be applied to data type and problem domain combinations;
- DS-4. is capable of applying AI techniques and methods in the practice of Data Science.

Beyond the general final attainment levels for an AI graduate listed above, the graduate of the Cognitive Science specialization:

- CogSci-1. has basic knowledge of both disciplines (AI and Psychology);
- CogSci-2. has knowledge of the experimental methods and findings from research into the cognitive psychology of behaviour;
- CogSci-3. can apply empirical methods to improve the understanding of neurobiological processes and phenomena;
- CogSci-4. is capable of modelling behaviour to create opportunities for simulation and further analysis, exploiting the potential and limits of various representations, coupled with studies of computational mechanisms;
- CogSci-5. is capable of modelling at the level of neural networks.

Beyond the general final attainment levels for an AI graduate listed above, the graduate of the Human Ambience specialization:

- HA-1: has an overview of the literature and practice in the area of Ambient Intelligence and Ubiquitous and Pervasive Computing technology;
- HA-2: has basic knowledge of the physiological, psychological or social aspects of human functioning that can be exploited in Ambient Intelligent systems;
- HA-3: is able to apply modelling techniques to the design of intelligent applications using Ubiquitous and Pervasive Computing technology to support human functioning;
- HA-4: is able to apply verification and validation techniques to evaluate the behaviour of Ambient Intelligent Systems.

3. Nadere toelatingseisen
Artikel 3.1 Toelatingseisen
1. Toelaatbaar tot de opleiding is de bezitter van een bewijs van toelating, verstrekt door of namens het faculteitsbestuur, omdat hij heeft aangetoond te voldoen aan de toelaatbaarheidseisen van kennis, inzicht en vaardigheden op het eindniveau van een wetenschappelijke bacheloropleiding.
2. De bezitter van het getuigschrift van de bacheloropleiding Artificial Intelligence (Kunstmatige Intelligentie) van een Nederlandse Universiteit,of voor de specialisatie "Cognitive Science" een bachelor diploma Psychologie, Engels op het niveau van het eindexamen vwo.
3. Indien sprake is van onderscheiden programma's binnen de opleiding, toetst de examencommissie of door de aanvrager is voldaan aan de eisen.
4. Degene die nog niet in het bezit is van een bachelorgraad, maar wel voldoet aan de eisen van kennis, inzicht en vaardigheden, vermeld in lid 2, kan desgevraagd voorwaardelijk worden toegelaten tot de aansluitende masteropleiding, voor zo ver het achterwege laten van de inschrijving zou leiden tot een onbillijkheid van overwegende aard.

Artikel 3.2 Premasterprogramma
1. Degene die over een bachelorgraad beschikt in een vakgebied dat in voldoende mate overeenkomt met het vakgebied van de masteropleiding, kan toelating verzoeken tot de premasteropleiding.
2. Een bewijs van een met goed gevolg afgeronde premasteropleiding geldt als bewijs van toelating tot de daarin vermelde masteropleiding in het aansluitende studiejaar.
3. Het bewijs van toelating heeft uitsluitend betrekking op het studiejaar dat gelegen is na het studiejaar, waarin de aanvraag voor dat bewijs is ingediend, tenzij het college van bestuur anders beslist.

Artikel 3.3 niet van toepassing (n.v.t.)

Artikel 3.4 Uiterste termijn aanmelding
1. Aanmelding, via Studielink, voor een masteropleiding door een student die geen bachelorexamen heeft behaald aan de VU is alleen mogelijk tot en met 31 mei 2015.
2. In afwijking van lid 1 dienen studenten die gebruik wensen te maken van diensten van het International Office op het gebied van visumbemiddeling en huisvesting zich voor 1 april 2015aan te melden.
3. Inschrijven voor een masteropleiding is mogelijk tot en met 31 augustus 2015.
4. Een student die aan de VU een bacheloropleiding heeft gevolgd en een masteropleiding wil volgen, kan zich aanmelden en inschrijven tot en met 31 augustus 2015.

3. Additional admission requirements
Article 3.1 Admission requirements
1. Applicants will be admitted to the degree programme if they hold a letter of acceptance, issued by or on behalf of the Faculty Board because they have demonstrated that they meet the knowledge, understanding and skills requirements of the final level of attainment in a university Bachelor's degree programme.
2. Applicants will be admitted to the degree programme if they hold a Bachelor's degree in Artificial Intelligence from a Dutch university or a Bachelor's degree in Psychology with a specialization in Cognitive Science. Their English proficiency must be equivalent to pre-university final-exam (VWO) level.
3. If the degree programme encompasses distinct programmes, the Examination Board will assess whether the applicant has met the applicable requirements.
4. Those not yet in possession of a Bachelor's degree, but who meet the admission requirements as regards the knowledge, insight and skills specified in paragraph 2, may on request be granted conditional admission to the associated Master's programme, insofar as failure to grant admission would result in undue unfairness.

Article 3.2 Pre-Master's programme
1. Applicants who have a Bachelor's degree in a field that sufficiently corresponds to the field of the Master's programme may request admission to the pre-Master's programme.
2. A certificate stating that the candidate has successfully completed the pre-Master's programme serves as a letter of acceptance for the associated Master's programme in the next academic year.
3. The letter of acceptance relates exclusively to the academic year following the academic year in which the application for the letter of acceptance was submitted, unless the Executive Board decides otherwise.

Article 3.3 not applicable

Article 3.4 Registration deadline
1. Students who wish to apply for a Master's programme and have not obtained their Bachelor's degree at VU University Amsterdam must apply through Studielink by 31 May 2015.
2. As an exception to paragraph 1, students who wish to use the services of the International Office for assistance in securing visas and housing need to apply before 1 April 2015.
3. Registration for a Master's programme is only possible until 31 August 2015.
4. Students who have obtained their Bachelor's degree from VU University Amsterdam and wish to register for a Master's programme can apply and register until 31 August 2015.

Artikel 3.5 Taaleisen Engels bij Engelstalige masteropleidingen

1. Aan de eis inzake beheersing van de instructietaal Engels, is voldaan na het met goed gevolg afleggen van één van de volgende examens of een equivalent daarvan:
   - IELTS: 6.5
   - TOEFL paper based test: 580
   - TOEFL internet based test: 92-93
   - Cambridge Advanced English: A, B of C.
2. Vrijstelling van het een in het eerste lid genoemd examen Engels wordt verleend aan degene die vwo eindexamen Engels heeft behaald of aan degene die niet langer dan twee jaar voor aanvang van de opleiding:
   - heeft voldaan aan de eisen van de VU-test Engelse Taalvaardigheid TOEFL ITP, minimaal met de scores zoals bepaald in het eerste lid, of
   - een vooropleiding secundair of tertiair onderwijs heeft genoten in een Engelstalig land dat als zodanig is vermeld op de website van de VU, of
   - - die over een diploma 'international baccalaureate' (Engelstalig) beschikt

Artikel 3.6 Vrij programma

1. De student heeft de mogelijkheid om, onder bepaalde voorwaarden, een eigen onderwijsprogramma samen te stellen dat afwijkt van de door de opleiding voorgeschreven onderwijsprogramma's.
2. De samenstelling van een dergelijk programma behoeft de voorafgaande goedkeuring van de examencommissie die daarvoor het meest in aanmerking komt.
3. Het vrije programma wordt door de student samengesteld uit de onderwijseenheden die door de Vrije Universiteit worden verzorgd en heeft ten minste de omvang, breedte en diepgang van een reguliere masteropleiding.

4. Opbouw van het curriculum
Artikel 4.1 Samenstelling opleiding

1. De opleiding heeft een studielast van 120 EC en omvat de volgende onderdelen:
   a. Verplichte onderwijseenheden
   b. Praktische oefeningen
   c. Keuzeruimte
2. In afwijking van het bepaalde in lid 1 kunnen studenten onder bepaalde voorwaarden en met goedkeuring vooraf van de examencommissie kiezen voor een vrije master.

Artikel 4.2 Verplichte onderwijseenheden

Article 3.5 English language requirements for Master's programmes taught in English

1. Successful completion of one of the following examinations or an equivalent is regarded as proof that the requirement relating to proficiency in English as the language of instruction has been met:
   - IELTS: 6.5
   - TOEFL paper-based test: 580
   - TOEFL internet-based test: 92-93
   - Cambridge Advanced English: A, B or C.
2. An exemption from the English language proficiency test referred to in paragraph 1 will be granted to those who have passed the VWO final examination in English and to those who have met :
   - the requirements of the university English language TOEFL ITP proficiency test no more than two years prior to the start of their programme with scores satisfying the minimums referred to in paragraph 1, or
   - anyone who has completed secondary or higher education in an English-speaking country as specified on the relevant pages of VU University Amsterdam's website, or
   - those who have an international baccalaureate diploma (in English).

Article 3.6 Free programme

1. Under certain conditions, students have the option of departing from the standard curriculum as prescribed by the programme and composing their own study programme.
2. The composition of such a programme requires the prior approval of the Examination Board that has the greatest jurisdiction over the programme components.
3. The free programme is to be composed by the student from educational units offered by VU University Amsterdam, and is to comprise at least the same study load, depth and scope as a standard Master's programme.

4. Structure of the curriculum
Article 4.1 Programme composition

1. The programme has a study load of 120 credits and consists of the following components:
   a. Required educational units
   b. Practical components
   c. Optional subjects (electives)
2. Notwithstanding the provisions of paragraph 1, students may compose their own Master's programme under certain circumstances and with the prior approval of the Examination Board.

Article 4.2 Required educational units

MSc Artificial Intelligence, Research Variant Cognitive Science						
Educational component	Subject code	Number of credits	Period or semester	Teaching method	Examination format	Level
Model-based Intelligent Environments	X_405056	6	1	h, pro	o	500
Seminar Cognitive Neuroscience	P_MSEMCNS	6	1	h	pres, o	500

Educational component	Subject code	Number of credits	Period or semester	Teaching method	Examination format	Level
Neural Models of Cognitive Processes*	P_MNEUMOD	6	2	h	t, pres, o	400
Interdisciplinary Research Methodology for IS	X_405085	6	2	h	t, o	400
Thinking and Deciding	P_MTHIDEC	6	2	h	pres, o	400
Knowledge Engineering	X_405099	6	2,3	h	v, o	400
Brain Imaging	P_MBRIMAG	6	3	h, w	t	400
Human Information Processing*	P_MHINFOP	6	5	h	t	400

* Course is taught every two years. It is taught in 2015-2016, but will NOT be taught in 2016-2017

MSc Artificial Intelligence, Research Variant Human Ambience						
Educational component	**Subject code**	**Number of credits**	**Period or semester**	**Teaching method**	**Examination format**	**Level**
Model-based Intelligent Environments	X_405056	6	1	h, pro	o	500
Behaviour Dynamics in Social Networks	X_400113	6	2	h	o	400
Interdisciplinary Research Methodology for IS	X_405085	6	2	h	t, o	400
Knowledge Engineering	X_405099	6	2,3	h	v, o	400
Agent Systems	X_405123	6	4	-	-	400
Master Project	X_400285	30	Ac. Year	pro	v, pres, o	600

MSc Artificial Intelligence, Research variant Intelligent Systems Design						
Educational component	**Subject code**	**Number of credits**	**Period or semester**	**Teaching method**	**Examination format**	**Level**
Evolutionary Computing	X_400111	6	1	h	t, o	400
Model-based Intelligent Environments	X_405056	6	1	h, pro	o	500
Advanced Selforganisation	X_400434	6	2	h	v	400
Interdisciplinary Research Methodology for IS	X_405085	6	2	h	t, o	400
Knowledge Engineering	X_405099	6	2,3	h	v, o	400
Knowledge Representation on the Web	X_	6	5	h	v, o	-
Data Mining Techniques	X_400108	6	5	h	o	-
Master Project	X_400285	30	Ac. Year	pro	v, pres, o	600

MSc Artificial Intelligence, Research variant Data Science						
Educational component	**Subject code**	**Number of credits**	**Period or semester**	**Teaching method**	**Examination format**	**Level**
Evolutionary Computing	X_400111	6	1	h	t, o	400
Machine Learning 1	X_418144	6	1	-	-	-
Model-based Intelligent Environments	X_405056	6	1	h, pro	o	500
Interdisciplinary Research Methodology for IS	X_405085	6	2	h	t, o	400
Large Scale Data Engineering	X_405116	6	2	-	-	-
Knowledge Engineering	X_405099	6	2,3	h	v, o	400

Educational component	Subject code	Number of credits	Period or semester	Teaching method	Examination format	Level
Information Visualization	X_418143	6	4	-	-	-
Experimental Design and Data Analysis	X_405078	6	5	h	v, o	400
Master Project	X_400285	30	Ac. Year	pro	v, pres, o	600

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Artikel 4.4 Keuzeruimte
De student kan, zonder voorafgaande toestemming van de examencommissie, de volgende keuzevakken volgen:

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Article 4.4 Optional subjects (electives)
The student does not need the prior approval of the Examination Board to take the following optional subjects:

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MSc Artificial Intelligence, Research Variant Cognitive Science

Constrained choice (6 EC vereist) — **Constrained choice (6 credits required)**

Educational component	Subject code	Number of credits	Period or semester	Teaching method	Examination format	Level
Evolutionary Computing	X_400111	6	1	h	t, o	400
Computational Intelligence and Learning Machines	X_417015	6	2	-	-	400

Constrained choice Data Analysis (6 EC vereist) — **Constrained choice Data Analysis (6 credits required)**

Educational component	Subject code	Number of credits	Period or semester	Teaching method	Examination format	Level
Advanced Data Analysis	P_MADVDAT	6	1	h	t, o	400
Experimental Design and Data Analysis	X_405078	6	5	h	v, o	400

Constrained choice (30 EC vereist) — **Constrained choice (30 credits required)**

Educational component	Subject code	Number of credits	Period or semester	Teaching method	Examination format	Level
Master Project	X_400285	30	Ac. Year	pro	v, pres, o	600
Master Thesis: Research Project Cognitive Science	P_MTHRCSC	30	Ac. Year	pro	v, pres, o	400

Aangeraden keuzevakken — **Recommended electives**

Educational component	Subject code	Number of credits	Period or semester	Teaching method	Examination format	Level
Internet programming	X_405082	6	1	h	t, o	500
Behaviour Dynamics in Social Networks	X_400113	6	2	h	o	400
Memory and Memory Disorders	P_MMEMORY	6	2	h	t, pres, o	400
History of Digital Cultures	X_418107	6	3	-	-	-
Seminar Attention	P_MSEMATT	6	3	h	v, pres	400
Agent Systems	X_405123	6	4	-	-	400
ICT4D: Information and communication technology for Development	X_405101	6	5	h, pro	-	400
Mini Master Project AI	X_400428	6	Ac. Year	pro	v	500
Review Paper	P_MREVPAP	6	Ac. Year	h	v	500

MSc Artificial Intelligence, Research Variant Human Ambience

Constrained choice (6 EC vereist) — **Constrained choice (6 credits required)**

Educational component	Subject code	Number of credits	Period or semester	Teaching method	Examination format	Level
Evolutionary Computing	X_400111	6	1	h	t, o	400

Educational component	Subject code	Number of credits	Period or semester	Teaching method	Examination format	Level
Computational Intelligence and Learning Machines	X_417015	6	2	-	-	400

Constrained choice Data Analysis (6 EC vereist) / **Constrained choice Data Analysis (6 credits required)**

Educational component	Subject code	Number of credits	Period or semester	Teaching method	Examination format	Level
Advanced Data Analysis	P_MADVDAT	6	1	h	t, o	400
Experimental Design and Data Analysis	X_405078	6	5	h	v, o	400

Aangeraden keuzevakken / **Recommended electives**

Educational component	Subject code	Number of credits	Period or semester	Teaching method	Examination format	Level
Intelligent Interactive Systems	X_418023	6	1	-	-	400
Psychology of Effective Gaming	X_418145	6	1	-	-	-
Multimedia Information Systems	X_418070	6	2	-	-	400
Technology for Games	X_418146	6	2	-	-	-
History of Digital Cultures	X_418107	6	3	-	-	-
The Social Web	X_405086	6	4	h	v, o	400
Serious Games	X_405097	6	5	h, pra	v, o	400
Beleid en management	S_BLM	6	1	h, w	o	-
Brain Imaging	P_MBRIMAG	6	4	h	t	400
Dynamica van Lineaire Systemen	B_DYNAMICA	3	1	h, pra	t, o	300
Health Promotion and Disease Prevention	AM_470811	6	1	h, w	t, o	500
Knowledge and Media	X_405065	6	1	w	v	400
Coordination Dynamics: principles and clinical applications	B_CLINCORDYN	3	2	h, pra	t	400
Energy Flow Models	B_ENERFLOW	3	2	h, pra	t, v	500
Governance of Security and Policing	S_GSP	6	2	h	t	-
Health Psychology	AM_470730	6	2	h, w	t, pres	400
Memory and Memory Disorders	P_MMEMORY	6	2	h	t, pres, o	400
Networked Organizations and Communication	S_NOC	6	2	h, w	t, v, pres	-
Neural Models of Cognitive Processes*	P_MNEUMOD	6	2	h	t, pres, prac	400
Ondernemerschap en innovatie, een relationeel perspectief	S_OIRP	6	2	h, w	o	-
Seminar Cognitive Neuroscience	P_MSEMCNS	6	2	h	o, pres	500
Thinking and Deciding	P_MTHIDEC	6	2	h	pres, o	400
Veiligheid en burgerschap	S_VB	6	2	h, w	t	-
Prevention of Mental Health Problems	AM_470840	6	3	h, w	t, v	400
Seminar Attention	P_MSEMATT	6	3	h	v, pres	400
Information Retrieval 1	X_418043	6	3	-	-	500

Educational component	Subject code	Number of credits	Period or semester	Teaching method	Examination format	Level
Advanced Logic	X_405048	6	4	h, w	t, o	500
Fysieke veiligheid en crisisbeheersing	S_FVC	6	4	h, w	t	-
Knowledge Representation on the Web	X_B_PERCACTION	6	5	h	v, o	400
Perception for Action		3	4	h, w	o	500
Spatial Criminology	R_SpaCrim	6	4	w	v, pres	600
Data Mining Techniques	X_400108	6	5	h	o	500
Human Information Processing*	P_MHINFOP	6	5	h	t	400
ICT4D: Information and communication technology for Development	X_405101	6	5	h, pro	-	400
Misdaadanalyse	R_Misd.anaC	6	5	h	t, o	500
Aging and Dementia	P_MAGINGD	6	1,2 3,4	h	t	400
Mini Master Project AI	X_400428	6	Ac. Year	pro	v	500

* Course is taught every two years. It is taught in 2015-2016, but will NOT be taught in 2016-2017

MSc Artificial Intelligence, Research variant Intelligent Systems Design

Constrained choice (12 EC vereist) — **Constrained choice** (12 credits required)

Educational component	Subject code	Number of credits	Period or semester	Teaching method	Examination format	Level
Neural Networks	X_400132	6	1	h	t, o	500
Information Retrieval 1	X_418043	6	3	-	-	500
The Social Web	X_405086	6	4	h	v, o	400
Experimental Design and Data Analysis	X_405078	6	5	h	v, o	400
Agent Systems	X_405123	6	4	-	-	400

Aangeraden keuzevakken (36 EC keuzeruimte) — **Recommended electives** (36 credits)

Educational component	Subject code	Number of credits	Period or semester	Teaching method	Examination format	Level
Knowledge and Media	X_405065	6	1	w	v	400
Behaviour Dynamics in Social Networks	X_400113	6	2	h	o	400
Distributed Algorithms	X_400211	6	2	h, w	t	500
Distributed Systems	X_400130	6	2	h	t	400
History of Digital Cultures	X_418107	6	3	-	-	-
Advanced Logic	X_405048	6	4	h, w	t, o	500
Large Scale Data Engineering	X_405116	6	2	-	-	-
ICT4D: Information and communication technology for Development	X_405101	6	5	h, pro	-	400
Operating Systems	X_405067	6	5	h	t	400
Mini Master Project AI	X_400428	6	Ac. Year	pro	v	500

MSc Artificial Intelligence, Research variant Data Science

Data Analysis (6 EC vereist) — **Data Analysis** (12 credits required)

Educational component	Subject code	Number of credits	Period or semester	Teaching method	Examination format	Level
Applied Language Technology	X_405120	6	1	-	-	-
Information Retrieval 1	X_418043	6	3	-	-	500
Data Mining Techniques	X_400108	6	5	h	o	500

Data Management (12 EC vereist) / **Data Management** (12 credits required)

Educational component	Subject code	Number of credits	Period or semester	Teaching method	Examination format	Level
Knowledge and Media	X_405065	6	1	w	v	400
Distributed Systems	X_400130	6	2	h	t	400
Knowledge Representation on the Web	X_	6	5	h	v, o	400
The Social Web	X_405086	6	4	h	v, o	400

Aangeraden keuzevakken (18 EC keuzeruimte) / **Recommended electives** (18 credits)

Educational component	Subject code	Number of credits	Period or semester	Teaching method	Examination format	Level
Coding and Cryptography	X_405041	6	1	h, w	t, o	500
Concurrency and Multithreading	X_405064	6	1	h, w	t, o	400
Internet programming	X_405082	6	1	h	t, o	500
Multimedia Authoring	X_405098	6	1	h, pra	v	400
Neural Networks	X_400132	6	1	h	t, o	500
Parallel Programming for High-Performance Applications	X_400161	6	1	h, pra	t	400
Service Oriented Design	X_405061	6	1	h	v	400
Advanced Selforganisation	X_400434	6	2	h	v	400
Behaviour Dynamics in Social Networks	X_400113	6	2	h	o	400
Distributed Algorithms	X_400211	6	2	h, w	t	500
Software Architecture	X_400170	6	2	h	-	400
History of Digital Cultures	X_418107	6	3	-	-	-
Advanced Logic	X_405048	6	4	h, w	t, o	500
Mobile Systems	X_418068	6	4	-	-	400
ICT4D: Information and communication technology for Development	X_405101	6	5	h, pro	-	400
Logical Verification	X_400115	6	5	h, pra	t, o	500
Operating Systems	X_405067	6	5	h	t	400
Software Testing	X_400439	6	5	h	t, o	400
Mini Master Project AI	X_400428	6	Ac. Year	pro	v	500

De student die een ander vak wil volgen, dan de genoemde onderwijseenheden, dient vooraf schriftelijk toestemming van de examencommissie verkregen te hebben.

Students who wish to take a course other than those listed must first obtain prior written permission from the Examination Board.

Artikel 4.5 Volgordelijkheid tentamens
Eventuele tentamens en/of praktische oefeningen waaraan niet eerder kan worden deelgenomen dan nadat het tentamen of de tentamens van andere (eerdere)

Article 4.5 Sequence of exams
The study guide details those examinations and/or practical exercises that may only be taken once the exams of other (prior) components have been passed.

onderdelen is/zijn behaald worden vernoemd in de studiegids.

Artikel 4.6 Deelname aan praktische oefening en werkgroepbijeenkomsten
1. Van elke student wordt actieve deelname verwacht aan het examenonderdeel waarvoor hij staat ingeschreven.
2. Naast de algemene eis dat de student actief participeert in het onderwijs, worden de aanvullende eisen per examenonderdeel in de studiegids omschreven. Hier staat ook omschreven voor welke onderdelen van het examenonderdeel een aanwezigheidsplicht geldt.
3. Bij het begin van een examenonderdeel is een beschrijving beschikbaar waarin een beschrijving staat van:
   - De eindtermen van het examenonderdeel;
   - De studierichtlijnen voor het behalen van een positief resultaat;
   - De manier waarop de eindtermen worden getoetst;
   - De tentamenregeling en herkansingsregeling;
   - De begeleiding door de docent(en) binnen en buiten de geroosterde uren;
   - De onderdelen van het examenonderdeel voor welke een aanwezigheidsplicht geldt;
   - De manier waarop de student feedback krijgt op ingeleverde opdrachten, verslagen en presentaties tijdens het examenonderdeel.
4. Als een student door overmacht niet aanwezig kan zijn bij een verplicht onderdeel van het examenonderdeel, dient hij dit zo snel mogelijk schriftelijk te melden bij de examinator en de studieadviseur. De examinator kan, na overleg met de studieadviseur, besluiten om de student een vervangende opdracht op te leggen.
5. Het is niet toegestaan om verplichte onderdelen van een examenonderdeel te missen als er geen sprake is van overmacht.
6. Bij kwalitatief of kwantitatief onvoldoende deelname kan, welke van te voren is vastgelegd en is goedgekeurd door de opleidingsdirecteur, de examinator de student uitsluiten van verdere deelname aan het examenonderdeel of een gedeelte daarvan.

Artikel 4.7 Maximale vrijstelling
Maximaal 90 studiepunten van het onderwijsprogramma kunnen worden behaald op basis van verleende vrijstellingen.

Artikel 4.8 Geldigheidsduur resultaten
De geldigheidsduur van tentamens en vrijstellingen voor tentamens is conform Artikel 4.8 OER deel A.

Artikel 4.9 Graad
Aan de student die het masterexamen met goed gevolg heeft afgelegd, wordt de graad Master of Science verleend. De verleende graad wordt op het getuigschrift

Article 4.6 Participation in practical exercises and working group meetings
1. Student are expected to participate actively in all degree components for which they are registered.
2. In addition to the general requirement regarding active participation, the study guide details additional requirements for each degree component, including attendance requirements.
3. At the start of each degree component, a specification will be made available which details:
   - The final attainment levels of the degree component;
   - The study guidelines for passing the degree component;
   - The way in which the final attainment levels are assessed;
   - The regulations for examinations and resits;
   - The guidance provided by lecturers during scheduled hours and otherwise;
   - Component attendance requirements;
   - -The provision of feedback to the student on assignments and reports submitted, and presentations given during the degree component.
4. If a student is prevented by force majeure from attending a required degree component, then the student must send written notification of his or her absence to the examiner and the study advisor as soon as possible. The examiner may, after consultation with the study advisor, give the student an alternative assignment.
5. Absence from degree components with required attendance is only allowed in the case of force majeure.
In the event of inadequate participation, either qualitative or quantitative, the examiner may exclude the student from further participation in the degree component or a part of the degree component. The details of the student's inadequate participation must be recorded in advance and approved by the Director of Studies.

Article 4.7 Maximum exemption
Up to 90 credits of the degree curriculum may be awarded on the basis of exemptions.

Article 4.8 Period of validity for results
The period of validity for examinations and exemptions for exams is in accordance with Article 4.8 of Part A of the Academic and Examination Regulations.

Article 4.9 Degree
Students who fulfil all the requirements of the final Master's degree assessment will be awarded the degree of Master of Science. Details of the degree awarded will

vermeld. Ingeval het een gezamenlijke opleiding ('joint degree') betreft, wordt dat vermeld op het getuigschrift.

5.Overgangs- en slotbepalingen
Artikel 5.1 Wijziging en periodieke beoordeling deel B
1. Een wijziging van de onderwijs- en examenregeling van deel B wordt door het faculteitsbestuur vastgesteld na advies van de desbetreffende opleidingscommissie. Het advies wordt in afschrift verzonden aan het bevoegde medezeggenschapsorgaan.
2. Een wijziging van de onderwijs- en examenregeling behoeft de instemming van het bevoegde medezeggenschapsorgaan op de onderdelen die niet de onderwerpen van artikel 7.13, tweede lid onder a t/m g en v, alsmede het vierde lid WHW betreffen en de toelatingseisen tot de masteropleiding.
3. Een wijziging van de onderwijs- en examenregeling kan slechts betrekking hebben op een lopend studiejaar, indien de belangen van de studenten daardoor niet aantoonbaar worden geschaad.

Artikel 5.2 Overgangsbepalingen
In afwijking van de vigerende onderwijs- en examenregeling gelden voor de studenten die met de opleiding zijn begonnen onder een eerdere onderwijs- en examenregeling de volgende overgangsbepalingen:

Artikel 5.3 Bekendmaking
1. Het faculteitsbestuur draagt zorg voor een passende bekendmaking van deze regeling, alsmede van elke wijziging daarvan.
2. De onderwijs- en examenregeling wordt geplaatst op de website van de faculteit en wordt geacht te zijn opgenomen in de studiegids.

Artikel 5.4 Inwerkingtreding
Deze regeling treedt in werking met ingang van 31 augustus 2015.

Advies opleidingscommissies, 2 juni 2015, d.d.

Instemming bevoegd medezeggenschapsorgaan, d.d. 15 juli 2015 (FSr)

Vastgesteld door het faculteitsbestuur van de Faculteit der Exacte Wetenschappen op 21 augustus 2015

be recorded on the degree certificate. If the student is studying for a joint degree, then this will be mentioned on the degree certificate.

5.Transitional and final provisions
Article 5.1 Amendments and periodic assessment of Part B
1. An amendment to Part B of the Academic and Examination Regulations will be adopted by the Faculty Board on the recommendation of the relevant Programme Committee. A copy of this recommendation will be sent to the faculty's consultation body.
2. An amendment to the Academic and Examination Regulations requires the endorsement of the faculty's consultation body for those sections which do not relate to the subjects of Article 7.13 paragraphs 2 a to g and v, and paragraph 4 of the Act.
3. An amendment to the Academic and Examination Regulations may only relate to an academic year already in progress if the interests of the students are not demonstrably harmed.

Article 5.2 Transitional provisions
Notwithstanding the current Academic and Examination Regulations, the following transitional provisions apply to students who started the programme when an earlier version of the Academic and Examination Regulations was in force:
Article 5.3 Publication
1. The Faculty Board will ensure that these regulations are properly published, and that notice is given of each amendment.
2. The Academic and Examination Regulations will be published on the faculty's website and shall be included in the study guide.

Article 5.4 Entry into force
These regulations take effect on 31 August 2015.

Recommendations of the programme committees: 2 June 2015.

Consent granted by the consultation body FSr (15 July 2015)

Adopted by the Board of the Faculty of Sciences on 21 August 2015.

Bijlage I
Overzicht artikelen waarvan in de WHW is bepaald dat deze in de OER moeten worden opgenomen (omkaderde artikelen):

Deel A
art. 1.17.13 lid 1 WHW
art. 2.17.13 lid 2 sub w
art. 3.27.13 lid 2 sub e
art. 4.27.13 lid 2 sub h en l
art. 4.37.13 lid 2 sub n
art. 4.47.13 lid 2 sub o
art. 4.57.13 lid 2 sub j, h
art. 4.77.13 lid 2 sub r
art. 4.87.13 lid 2 sub k
art. 4.97.13 lid 2 sub p
art. 4.107.13 lid 2 sub q
art. 4.117.13 lid 2 sub a
art. 5.17.13 lid 2 sub u
art. 5.27.13 lid 2 sub m

Deel B
art. 1.27.13 lid 2 sub i
art. 2.17.13 lid 1 sub b, c
art. 2.27.13 lid 2 sub c
art. 3.17.25 lid 4
art. 4.17.13 lid 2 sub a
art. 4.27.13 lid 2 sub e, h, j, l,
art. 4.37.13 lid 2 sub t
art. 4.47.13 lid 2 sub e, h, j, l,
art. 4.57.13 lid 2 sub s
art. 4.67.13 lid 2 sub d
art. 4.87.13 lid 2 sub k

Bijlage II

Appendix I
Summary of Articles which must be included in the Academic and Examination Regulations in accordance with the Act (articles in boxes):

Part A
Art. 1.17.13 paragraph 1 of the Act
Art. 2.17.13 paragraph 2 (w)
Art. 3.27.13 paragraph 2 (e)
Art. 4.27.13 paragraph 2 (h, l)
Art. 4.37.13 paragraph 2 (n)
Art. 4.47.13 paragraph 2 (o)
Art. 4.57.13 paragraph 2 (j, h)
Art. 4.77.13 paragraph 2 (r)
Art. 4.87.13 paragraph 2 (k)
Art. 4.97.13 paragraph 2 (p)
Art. 4.107.13 paragraph 2 (q)
Art. 4.117.13 paragraph 2 (a)
Art. 5.17.13 paragraph 2 (u)
Art. 5.27.13 paragraph 2 (m)

Part B
Art. 1.27.13 paragraph 2 (i)
Art. 2.17.13 paragraph 1 (b, c)
Art. 2.27.13 paragraph 2 (c)
Art. 3.17.25 paragraph 4
Art. 4.17.13 paragraph 2 (a)
Art. 4.27.13 paragraph 2 (e, h, j, l)
Art. 4.37.13 paragraph 2 (t)
Art. 4.47.13 paragraph 2 (e, h, j, l)
Art. 4.57.13 paragraph 2 (s)
Art. 4.67.13 paragraph 2 (d)
Art. 4.87.13 paragraph 2 (k)

Appendix II