Teaching and Examination Regulations

MASTER's Degree Programme

Artificial Intelligence

B. Programme-specific section

Academic year 2017-2018

Section B: Programme-specific section

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1. General provisions

Article 1.1 Definitions

Not applicable

Article 1.2 Degree programme information

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.
3. A unit of study comprises 6 EC or a multiple thereof.

Article 1.3 Intake dates

The programme is offered starting in the first semester of the academic year only
(1 September) The intake date(s) mentioned in this paragraph ensure(s) that a programme can be completed within the nominal study duration set for the programme.

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 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.
- 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 listed below.

Cognitive Science
Socially Aware Computing

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

- Has basic knowledge of both disciplines (AI and Psychology);
- Has knowledge of the experimental methods and findings from research into the cognitive psychology of behaviour;
- Can apply empirical methods to improve the understanding of neurobiological processes and phenomena;
- 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;
- 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 Socially Aware Artificial Intelligence:

- Has a solid academic knowledge of and insight in the field of Socially Aware Artificial Intelligence, including the required background knowledge from Ambient Intelligence, Ubiquitous Computing, Artificial Intelligence and Information Sciences, which builds upon and goes beyond the level of a Bachelor degree in any of those disciplines.
- Has basic knowledge of physiological, psychological, or social aspects of human functioning that can be exploited in Socially Aware Artificially Intelligent systems.
- Has in-depth knowledge, insight and skills in at least one area of the human-oriented disciplines, e.g. Clinical and Cognitive Psychology, Social Sciences, Movement Sciences, Criminology, or Medicine.
- Is able to acquire specialist knowledge, insights and skills in other areas in of Socially Aware Artificial Intelligence within a reasonable period of time.
- Has acquired practical skills (including computational modelling, verification, and validation techniques) in areas relevant to Socially Aware Artificial Intelligence at an academic level.
- Has solid knowledge on different scientific research methods (both qualitative and quantitative), and is able to select and apply appropriate methods to concrete problems in the context of Socially Aware Artificial Intelligence.
- Is aware of the applications of Socially Aware Artificial Intelligence in general and of the chosen human-oriented specialisation in particular
- Is able to apply his/her knowledge and skills to new or otherwise unknown problems. This includes the ability to combine and integrate separate pieces of knowledge and skills from different sub-areas (within human-oriented as well as technical disciplines) within broader contexts.
- Is capable of designing a project plan on the basis of a realistic problem description in the area of Socially Aware Artificial Intelligence, and to contribute to its progress with original solutions.
- Is able to consult and use the (international) professional literature in the relevant academic areas in a largely autonomous fashion.
- Is able to analyse and evaluate scientific results, and to use them to draw conclusions in a societally and ethically responsible manner.
- Is able to function in professional situations where scientific knowledge and skills in Socially Aware Artificial Intelligence are required. Has developed a critical, scientific attitude and is aware of the societal aspects of Socially Aware Artificial Intelligence.

- Is able to communicate with others at a professional level and to give clear and non-ambiguous oral and written presentations of the results of his/her work, as well as of the underpinning

3. Further 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 Limited programme capacity

Not applicable

Article 3.4 Final deadline for registration

A candidate must submit a request to be admitted to the programme through Studielink before 1 June in the case of Dutch students, before 1 April in the case of EU students and before 1 February in the case of non-EU students. Under exceptional circumstances, the Examinations Board may consider a request submitted after this closing date.

Article 3.5 English language requirement for English-language Master's programmes

1. The proficiency requirement in English as the language of instruction can be met by the successful completion of one of the following examinations or an equivalent:
   - IELTS: 6.5
   - TOEFL paper based test: 580
   - TOEFL internet based test: 92-93
   - Cambridge Advanced English: A, B or C.
2. Exemption is granted from the examination in English referred to in the first paragraph to students who, within two years of the start of the programme:
   - met the requirements of the VU test in English language proficiency TOEFL ITP, with at least the scores specified in paragraph 1, or
   - had previous education in secondary or tertiary education in an English-speaking country as listed on the VU website, or
   - have an English-language 'international baccalaureate' diploma]

Article 3.6 Free curriculum

1. Subject to certain conditions, the student has the option of compiling a curriculum of his/her own choice which deviates from the curricula prescribed by the programme.
2. The concrete details of such a curriculum must be approved beforehand by the most

appropriate Examinations Board.

3. The free curriculum is put together by the student from the units of study offered by Vrije Universiteit Amsterdam or another institution of higher education and must at least have the size, breadth and depth of a regular Master's programme.

4. Curriculum structure

Article 4.1 Composition of programme

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 Compulsory units of study

The compulsory units of study are:

Research Variant Cognitieve Science

Course Code	Course Name	EC	Period	Level
P_MBRIMAG	Brain Imaging	6	4	400
P_MNEUMOD	Neural Models of Cognitive Processes	6	2	400
P_MSEMCNS	Seminar Cognitive Neuroscience	6	1	500
X_405056	Model-based Intelligent Environments	6	5	500
X_405085	Interdisciplinary Research Meth for IS	6	2	500
X_405099	Knowledge Engineering	6	2	400
XM_40012	Machine Learning for the Quantified Self	6	Ac. Year	400

Socially Aware Computing

Course Code	Course Name	EC	Period	Level
X_400113	Behaviour Dynamics in Social Networks	6	2	400
X_400285	Master Project AI	30	Ac. Year	600
X_405099	Knowledge Engineering	6	2	400
XM_40010	Cognitive Psychology and its Application	6	1	400
XM_40012	Machine Learning for the Quantified Self	6	6	400
XM_40022	Social Agents and Affective Computing	6	5	400
XMU_405123	Agent Systems	6	4	400
XMU_418023	Intelligent Interactive Systems	6	1	400

Article 4.3 Practical exercise

Except for those practical components incorporated in the compulsory units of study above and in relevant electives, the programme has no separate practical exercise.

Article 4.4 Electives

The student can take of the following electives:

Research Variant Cognitive Science

Constrained Choice Data Analysis (6 EC required)

Course Code	Course Name	EC	Period	Level
P_MADVDAT	Advanced Data Analysis	6	1	400
X_405078	Experimental Design and Data Analysis	6	4	400

Constrained Choice (30 EC required)

Course Code	Course Name	EC	Period	Level
P_MTHRCSC	M Thesis Rsrch Prjct Cogn. Science	30	Ac. Year	400
X_400285	Master Project AI	30	Ac. Year	600

Optional Courses

Course Code	Course Name	EC	Period	Level
P_MMEMORY	Memory and Memory Disorders	6		400
P_MREVPAP	Review Paper	6	Ac. Year	500
P_MSEMATT	Seminar Attention	6	5	400
X_400113	Behaviour Dynamics in Social Networks	6	2	400
X_405082	Internet programming	6	1	400
X_405101	ICT4D	6	5	400
X_405129	Watson Innovation	6	2	400
XM_400428	Mini Master Project AI	6	Ac. Year	500
XMU_405123	Agent Systems	6	4	400
XMU_418107	History of digital cultures	6	3	400

<u>Socially Aware Computing</u>

Constrained Choice Data Analysis (6 EC required)

Course Code	Course Name	EC	Period	Level
P_MADVDAT	Advanced Data Analysis	6	Period 1	400
X_405078	Experimental Design and Data Analysis	6	Period 4	400

Artificial Intelligence

Course Code	Course Name	EC	Period	Level
X_400108	Data Mining Techniques	6	Period 5	500
X_400111	Evolutionary Computing	6	Period 1	400
X_405048	Advanced Logic	6	Period 4	500
X_405086	The Social Web	6	Period 4	400
X_405101	ICT4D	6	Period 5	400
X_405111	Seminar	6	Ac. Year	400
XM_400428	Mini Master Project AI	6	Ac. Year	500
XMU_417015	Computational Intelligence	6	Period 2	400
XMU_418169	Knowledge Representation on the Web	6	Period 5	0

Criminology

Course Code	Course Name	EC	Period	Level
R_Misd.anaC	Misdaadanalyse en daderprofilering	6	Period 4	400
R_SpaCrim	Spatial Criminology	6	Period 5	600

Health Sciences

Course Code	Course Name	EC	Period	Level

AM_470730	Health psychology	6	Period 2	400
AM_470811	Health promotion and disease prevention	6	Period 2	500
AM_470840	Prevention of Mental Health Problems	6	Period 3	400

Information Sciences

Course Code	**Course Name**	**EC**	**Period**	**Level**
X_405065	Knowledge and Media	6	Period 1	500
X_405097	Serious Games	6	Period 5	400
XMU_418043	Information Retrieval 1	6	Period 3	500
XMU_418107	History of digital cultures	6	Period 3	400
XMU_418145	Psychology of Effective Gaming	6	Period 1	0
XMU_418146	Technology for Games	6	Period 2	0

Human Movement Sciences

Course Code	**Course Name**	**EC**	**Period**	**Level**
B_CLINCORDYN	Coordination Dynamics: Prin. and. Appl.	6	Period 2	400
B_DYNAMICA	Dynamica van Lineaire Systemen	3	Period 1	300
B_ENERFLOW	Energy Flow Models	3	Period 1	500
B_PERCACTION	Perception for Action	3	Period 4	500

Psychology

Course Code	**Course Name**	**EC**	**Period**	**Level**
P_MAGINGD	Aging and Dementia	6	Period 2+3	400
P_MBRIMAG	Brain Imaging	6	Period 4	400
P_MMEMORY	Memory and Memory Disorders	6		400
P_MNEUMOD	Neural Models of Cognitive Processes	6	Period 2	400
P_MSEMATT	Seminar Attention	6	Period 5	400
P_MSEMCNS	Seminar Cognitive Neuroscience	6	Period 1	500

If the student wishes to take a different course than the units of study listed, advance permission must be obtained in writing from the Examinations Board.

Article 4.5 Sequence of examinations

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.

Article 4.6 Participation in practical exercise and tutorials

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.
6. 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 Validity period for results

No further specific provisions to article 4.8 of TER part A.

Article 4.9 Degree

Students who have successfully completed their Master's final examination are awarded a Master of Science degree. The degree awarded is stated on the diploma. If it is a joint degree, this will also be stated on the diploma.

5. Transitional and final provisions

Article 5.1 Amendments and periodic review

1. Any amendment to the Teaching and Examination Regulations will be adopted by the faculty board after taking advice, and if necessary approval by the Programme Committee concerned. A copy of the advice will be sent to the authorized representative advisory body.
2. An amendment to the Teaching and Examination Regulations requires the approval of the authorized representative advisory body if it concerns components not related to the subjects of Section 7.13, paragraph 2 sub a to g and v of the WHW and the requirements for admission to the Master's programme.
3. An amendment to the Teaching and Examination Regulations can only pertain to an academic year that is already in progress if this does not demonstrably damage the interests of students.

Article 5.2 Transitional provisions

Notwithstanding the current Teaching and Examination Regulations, the following transitional provisions apply for students who started the programme under a previous set of Teaching and Examination Regulations:

Article 5.3 Publication

1. The faculty board will ensure the appropriate publication of these Regulations and any amendments to them.
2. The Teaching and Examination Regulations will be posted on VUnet.

Article 5.4 Effective date

These Regulations enter into force with effect from 1 September 2017.

Advice from Programme Committee, on 20 April 2017.

Advice from Examination Board of the Faculty of Science, on 10 November 2016

Approved by authorized representative advisory body, on 6 July 2017

Adopted by the Board of the Faculty of Science, on 21 July 2017.

Appendix I

List of articles that must be included in the OER pursuant to the WHW (articles in framed boxes):

Section A

Art. 1.1	7.13, para 1, WHW
Art. 2.1	7.13, para 2 sub w
Art. 3.2	7.13, para 2 sub e
Art. 4.2	7.13, para 2 sub h and l
Art. 4.3	7.13, para 2 sub n
Art. 4.4	7.13, para 2 sub o
Art. 4.5	7.13, para 2 sub j, h
Art. 4.7	7.13, para 2 sub r
Art. 4.8	7.13, para 2 sub k
Art. 4.9	7.13, para 2 sub p
Art. 4.10	7.13, para 2 sub q
Art. 4.11	7.13, para 2 sub a
Art. 5.1	7.13, para 2 sub u
Art. 5.2	7.13, para 2 sub m

Section B

Art. 1.2	7.13, para 2 sub i
Art. 2.1	7.13, para 1 sub b, c
Art. 2.2	7.13, para 2 sub c
Art. 3.1	7.25, para 4
Art. 4.1	7.13, para 2 sub a
Art. 4.2	7.13, para 2 sub e, h, j, l
Art. 4.3	7.13, para 2 sub t
Art. 4.4	7.13, para 2 sub e, h, j, l
Art. 4.5	7.13, para 2 sub s
Art. 4.6	7.13, para 2 sub d
Art. 4.8	7.13, para 2 sub k