Assessment plan for the curriculum of the Master's degree programme in Computational Cognitive Science, 2024-2025

Programme director: Prof. dr. J.P. Borst

Date advice Board of Examiners: June 7th, 2024

Date approval Faculty Board:

1. Vision on assessment

1. to stimulate students to develop strong academic skills in addition to mastery of content, assessment will include the diversity of skills relevant to a professional in computational cognitive science, which each have a substantial contribution to the final grade
2. to prepare students for their future careers, authentic assessment, geared towards future work, will be implemented where possible
3. to stimulate students' ability for critical reflection, assessment will include components for self and peer evaluation
4. to design teaching and assessment according to a learning pathway, course coordinators will jointly implement assessment strategies for subsequent courses within a learning pathway

2. Assessment guidelines

1. all courses need a minimum of two summative assessment activities
2. final tests or assessments that contribute substantially to the final grade are reviewed by a second examiner
3. for summative assessment counting 25% or less to the final grade, informal formative assessment activities can be used. For summative assessment counting more than 25% towards the final grade a formal formative assessment activity needs to be in place.
   informal formative assessment = ad hoc Q and A or feedback during lectures and tutorials
   formal formative assessment = a mock exam similar to the actual exam or feedback that is based on the actual grading tool in case of an assignment
4. how students can use supporting materials and supporting (AI) tools is explicitly stated for all graded assignments
5. in all courses where the use of supporting materials or supporting tools is prohibited, a supervised assessment item is included
6. for group work, part of the grade is dedicated to criteria related to collaboration and organization within groups
7. for all self and peer assessment a valid grading rubric needs to be provided to students

3. Learning outcomes of the degree programme

Learning Outcome *At the end of the programme, the graduate …*	
1	demonstrates knowledge, understanding and the ability to evaluate, analyse and interpret relevant data, all on a level that builds on and surpasses the level of the bachelor Artificial Intelligence, in at least three of the research areas below. In one research area of Computational Cognitive Science the master has specialised knowledge at an advanced level. a. Computational theories and models of cognitive processes b. Multivariate statistics c. Cognitive ergonomics d. Application of formal models of cognition in human-computer interaction and education e. Linguistics and language technology f. Cognitive neuroscience
2	demonstrates knowledge and understanding, on a level that builds on and surpasses the level of the bachelor Artificial Intelligence, in the empirical sciences (Psychology, Biology and Physics) and has experience applying and analysing results thereof.
3	demonstrates relevant knowledge and the ability to apply methods and techniques from mathematics and logic used in Computational Cognitive Science.
4	demonstrates relevant knowledge and the ability to use programming languages used in the field of Computational Cognitive Science.
5	has the ability to, on an international academic level, analyse problems, critically and constructively review both one's own and other scientific results, even if incomplete, and to communicate about this both individually and in a group, both orally and in written form, also in a broader societal context, to both specialists and nonspecialists.
6	has the ability to critically reflect on his/her own working method and knowledge and to recognize the need for continued learning with a high degree of autonomy, and is able to understand the scientific developments within the field of Computational Cognitive Science.

4. Overview of assessment methods, test moments for course units, and examiners

The abbreviations for the relevant assessment methods used in below table are the following:

- *Written Exam (WE)*
- *Multiple Choice (MC)*
- *Oral Exam (OR)*
- *Report (R)*
- *Presentation (P)*
- *Practical Work (PR)*
- *Assignment (AST)*

Year	**Period**	**Course**	**Course code**	**EC**	**Assessment methods**	**Does (part of the) assessment have a formative function?**	**Test moment(s)** (e.g. mid-term (MT), end-term (ET), continuous assessment (CA), exam week (EW), etc)	**First examiner**	**Second examiner**
Mandatory Course Units									
1	1a	Human-Centred Artificial Intelligence	WMCC023-05	5	R, P, AST	No	CA	F. Cnossen	C.L. Sibert
1	1a	Modelling of Human Language	WMCC018-05	5	AST	*TBD*	CA	S.D. Tokac	S.M. Jones
1	1a	Methods in CCS	WMCC015-05	5	P, PR, R	Yes	CA, ET	J.P Borst	L. Vortmann
1	1b	Advanced Statistical Modelling	WMCC005-05	5	WE, AST	Yes	CA, EW	J.C. van Rij-Tange	J.P. Borst
1	1b	Cognitive Modelling	WMCC019-05	5	AST, R	Yes	CA, ET	N.A. Taatgen	W. Kruijne
1	1b	Machine Learning for Computational Cognitive Science	WMCC017-05	5	P, AST	Yes	CA	A.I. Sburlea	M.A. Valdenegro-Toro
2	1a-2b	Final Research Project CCS	WMCC901-45	45	R, P	No	NA	Project Supervisors **	Project Supervisors **
Course Units in Specialisation(s) and Pre-approved Electives (organized by Own or Artificial Intelligence Degree Programme)									
2	1a	User Modelling [a]	WMCC021-05	5	R, PR	Yes	ET	C.L. Sibert	J.P. Borst
2	1a	Psycholinguistics and Cognition [b]	WMCC020-05	5	AST, OR	Yes	CA, ET	S.D. Tokac	J.C. van Rij-Tange
2	1a	Computational Cognitive Neuroscience [c]	WMCC010-05	5	R, AST	Yes	CA	M.K. van Vugt	N.A. Taatgen
2	1a	Arguing Agents	WMAI001-05	5	MC	No	EW	H.B. Verheij	L.C. Verbrugge
2	1a	Design of Multi-Agent Systems	WMAI004-05	5	R	Yes	CA	H.A. de Weerd	H.B. Verheij
2	1a	Pattern Recognition (for AI)	WMAI021-05	5	WE, PC, R, AST, PR	Yes	CA, EW	M.A. Dhali	S.H. Mohades Kasaei

Year	Period	Course	Course code	EC	Assessment methods	Does (part of the) assessment have a formative function?	Test moment(s) (e.g. mid-term (MT), end-term (ET), continuous assessment (CA), exam week (EW), etc)	First examiner	Second examiner
2	1a	Robotics for AI	WMAI011-05	5	R, PR	Yes	CA	R. Carloni	S.H. Mohades Kasaei
2	1a	Multi-agent Reinforcement Learning	WMAI033-05	5	WE, MC, AST, PR	Yes	CA, EW	J.S. Dibangoye	R.F. Cunha
2	1b	Advanced Hybrid Intelligence	WMAI036-05	5	R, P	Yes	CA	H.A. de Weerd	*TBD*
2	1b	Cognitive Robotics	WMAI003-05	5	R, P, PR, AST	Yes	CA, ET	S.H. Mohades Kasaei	R. Carloni
2	1b	Deep Learning	WMAI017-05	5	WE, AST, R, P	Yes	CA, EW	M.A. Valdenegro Toro	M. Sabatelli
2	1b	Logical Aspects of Multi-agent Systems	WMAI020-05	5	AST, PR, P	Yes	CA	L.C. Verbrugge	J.D. Top
2	1b	Advanced Machine Learning	WMAI030-05	5	MC, PR, R	No	CA, EW	H. Jaeger	M. Sabatelli
2	1b	Unsupervised Deep Learning	WMAI038-05	5	WE, P, PR	No	CA, EW	M. Zullich	M.A. Valdenegro Toro
1, 2	2a	Cognitive Engineering [a]	WMCC001-05	5	R, P, AST	Yes	CA	F. Cnossen	C.L. Sibert
1, 2	2a	Computational Simulations of Language [b]	WMCC009-05	5	AST	No	CA	S.M. Jones	J.C. van Rij-Tange
1, 2	2a	Non-Invasive Brain Computer Interfaces [c]	WMCC016-05	5	WE, AST, P	Yes	CA, EW	A.I. Sburlea	M.A. Valdenegro-Toro
1, 2	2a	Applied Cognitive Modelling	WMCC024-05	5	R, PR	No	CA, ET	N.A. Taatgen	J.P. Borst
1	2a	Advanced Analysis of Brain and Behavior	WMCC026-05	5	R, AST, P	Yes	CA, ET	L.M. Vortmann	A.I. Sburlea
1, 2	2a	Computational Game Theory	WMAI035-05	5	R, AST	Yes	CA, ET	D. Grossi	H.A. de Weerd
1, 2	2a	Computational Social Choice	WMAI016-05	5	R, AST	Yes	CA, ET	D. Grossi	L.C. Verbrugge
1, 2	2a	Control Methods for Robotics	WMAI037-05	5	*TBD*	*TBD*	*TBD*	R. Carloni	*TBD*
1, 2	2a	Trustworthy and Explainable AI	WMAI032-05	5	WE, P, PR	No	CA, EW	M. Zullich	M.A. Valdenegro Toro
1, 2	2a	Methodology in Artificial Intelligence	WMAI026-05	5	P, R, AST	Yes	CA, ET	M.A. Valdenegro Toro	J.S. Dibangoye
1, 2	2a	Neuroprosthetics	WMAI028-05	5	AST	Yes	CA	A.I. Sburlea	R. Carloni
1	2a-2b	First Year Project	WMCC027-15	15	R, P	No	ET	Project Supervisors **	Project Supervisors **
1, 2	2b	User-Centred Design [a]	WMCC025-05	5	R, P, PR	Yes	CA, ET	M.B. Schippers	J.O. van Bijsterveld
1, 2	2b	Cognitive Neural Networks	WMCC022-05	5	*TBD*	*TBD*	*TBD*	M.M. Cook	J.P. Borst

Year	Period	Course	Course code	EC	Assessment methods	Does (part of the) assessment have a formative function?	Test moment(s) (e.g. mid-term (MT), end-term (ET), continuous assessment (CA), exam week (EW), etc)	First examiner	Second examiner
1, 2	2b	Models of Human-Syntax Processing	WMCC014-05	5	AST, P, R	Yes	CA, ET	S.M. Jones	J.C. van Rij-Tange
1, 2	2b	Neuro-ergonomics	WMCC011-05	5	R, P	Yes	CA	E.G. Akyurek	*TBD*
1, 2	2b	Collective Intelligence	WMAI023-05	5	WE, AST	Yes	CA, EW	Z.L. Christoff	L.C. Verbrugge
1, 2	2b	Deep Learning Practical	WMAI034-05	5	R, P, PR	Yes	CA	M.A. Dhali	M.A. Valdenegro Toro
1, 2	2b	Human-Robot Interaction for Social Robots	WMAI027-05	5	R, P, AST	Yes	CA	P.A. Vogt	S.H. Mohades Kasaei
1, 2	2b	Natural Language Processing with Deep Learning	WMAI031-05	5	WE, R, PR, AST	No	CA, EW	*TBD*	T.M. Tashu
Course Units in Specialisation(s) and Pre-approved Electives (organized by Other Degree Programme)									
1, 2	2b	Language Technology Project [b]	LIX025M05	5	*	*	*	*	*
Pre-approved Electives (organized by Other Degree Programme) *									
1, 2	1a-1b	Introduction Science and Policy	WMSE002-10	10	*	*	*	*	*
1, 2	1a	Introduction to Data Science	WMCS002-05	5	*	*	*	*	*
1, 2	1a, 2a	Skills in Science Communication	WMEC006-05	5	*	*	*	*	*
1, 2	1a	Scientific Visualization	WMCS018-05	5	*	*	*	*	*
1, 2	1a	Introduction Science and Business	WMSE001-10	10	*	*	*	*	*
1, 2	1a	Auditory and Visual Perception	WMBC002-05	5	*	*	*	*	*
1, 2	1a	Cloud Computing and Cloud-Based Applications	WMCS032-05	5	*	*	*	*	*
1, 2	1a	Semantic Web Technology	LIX002M05	10	*	*	*	*	*
1, 2	1b	Applied Cognitive Neuroscience	PSMCB-4	5	*	*	*	*	*
1, 2	1b	Computer-Mediated Communication	LIX022M05	5	*	*	*	*	*
1, 2	1b	Philosophy of Neuroscience	FI184FR	5	*	*	*	*	*
1, 2	1b	Computational Semantics	LIX021M05	5	*	*	*	*	*

Year	Period	Course	Course code	EC	Assessment methods	Does (part of the) assessment have a formative function?	Test moment(s) (e.g. mid-term (MT), end-term (ET), continuous assessment (CA), exam week (EW), etc)	First examiner	Second examiner
1, 2	2a	Corpus Linguistics	LTR024M05	5	*	*	*	*	*
1, 2	2a	Natural Language Processing	LIX001M05	5	*	*	*	*	*
1, 2	2a	User Interface Evaluation	LIX024M05	5	*	*	*	*	*

[a] Course is part of specialisation: Human-Centred AI

[b] Course is part of specialisation: Human Language Modelling

[c] Course is part of specialisation: Cognitive Modelling and the Brain

* Pre-approved Electives organized by Other Degree Programme. For more information see the Assessment Plan of the Degree Programme organizing the course unit.

** The following examiners are allowed to supervise First Year Projects and Final Research Projects in the Computational Cognitive Science Master's Programme:

- drs. J.O. van Bijsterveld
- prof. dr. J.P. Borst
- J.D. Cardenas Cartagena, MSc.
- prof. dr. R. Carloni
- dr. Z.L. Christoff
- dr. F. Cnossen
- prof. dr. M.M. Cook
- R.F. Cunha, MSc.
- dr. M.A. Dhali
- prof. dr. J. Dibangoye
- prof. dr. D. Grossi
- prof. dr. H. Jaeger
- dr. S.M. Jones
- I.P. de Jong, MSc
- dr. S.K. Mehlhorn
- dr. S.H. Mohades Kasaei
- dr. S.M. van Netten
- dr. J.C. van Rij – Tange
- dr. M. Sabatelli
- dr. A.I. Sburlea
- dr. M.B. Schippers
- dr. J. Schoeffer
- prof. dr. L.R.B. Schomaker
- dr. C.L. Sibert
- prof. dr. N.A. Taatgen
- dr. T.M. Tashu
- dr. S.D. Tokaç
- J.D. Top, MSc.
- dr. M.A. Valdenegro Toro
- prof. dr. L.C. Verbrugge
- prof. dr. H.B. Verheij
- dr. P.A. Vogt

- dr. L.M. Vortmann
- dr. M.K. van Vugt
- dr. H.A. de Weerd
- dr. B.J. Wolf
- dr. M. Zullich

5. Relationship between course units and details of the learning outcomes

Please note in the table below the course units per block in the programme. Indicate which learning outcomes are assessed in which courses by adding an X in the relevant cell. ***An X means that the learning outcome is explicitly assessed (not merely addressed) in the course.***

			Learning outcomes of the degree programme					
			1	**2**	**3**	**4**	**5**	**6**
Period	**Course**	**Course code**	**Year 1 - compulsory courses**					
1a	Human-Centred Artificial Intelligence	WMCC023-05	c	X			X	X
1a	Modelling of Human Language	WMCC018-05	a					X
1a	Methods in CCS	WMCC015-05	f					
1b	Advanced Statistical Modelling	WMCC005-05	b	X	X			
1b	Cognitive Modelling	WMCC019-05	a, b	X		X		
1b	Machine Learning for Computational Cognitive Science	WMCC017-05	g		X			X
Period	**Course**	**Course code**	**Year 2 - compulsory courses**					
1a-2b	Final Research Project CCS	WMCC901-45	*	*	*	*	X	X
Period	**Course**	**Course code**	**Course Units in Specialisation(s) and Pre-approved Electives (organized by own or Artificial Intelligence Degree Programme)**					
1a	User Modelling [a]	WMCC021-05	a, c, d	X		X	X	
1a	Psycholinguistics and Cognition [b]	WMCC020-05	e					
1a	Computational Cognitive Neuroscience [c]	WMCC010-05	a, f	X			X	X
1a	Arguing Agents	WMAI001-05	a		X	X	X	
1a	Design of Multi-Agent Systems	WMAI004-05	a, e		X	X	X	
1a	Pattern Recognition (for AI)	WMAI021-05	b		X	X	X	
1a	Robotics for AI	WMAI011-05	g			X		
1a	Multi-agent Reinforcement Learning	WMAI033-05	a, d		X	X		
1b	Advanced Hybrid Intelligence	WMAI036-05	a, b	X	X		X	
1b	Cognitive Robotics	WMAI003-05				X		
1b	Deep Learning	WMAI017-05	g		X	X	X	
1b	Logical Aspects of Multi-agent Systems	WMAI020-05	a		X	X	X	
1b	Advanced Machine Learning	WMAI030-05			X			
1b	Unsupervised Deep Learning	WMAI038-05	a			X		
2a	Cognitive Engineering [a]	WMCC001-05	a, c, d	X			X	

			Learning outcomes of the degree programme					
			1	**2**	**3**	**4**	**5**	**6**
2a	Computational Simulations of Language [b]	WMCC009-05	e					
2a	Non-Invasive Brain Computer Interfaces [c]	WMCC016-05	g		X			
2a	Applied Cognitive Modelling	WMCC024-05	a, d, f	X		X	X	X
2a	Advanced Analysis of Brain and Behavior	WMCC026-05	a, b, f	X	X	X	X	X
2a	Computational Game Theory	WMAI035-05	a		X		X	X
2a	Computational Social Choice	WMAI016-05	a		X	X	X	
2a	Control Methods for Robotics	WMAI037-05		X		X		
2a	Trustworthy and Explainable AI	WMAI032-05	d				X	
2a	Methodology in Artificial Intelligence	WMAI026-05		X			X	X
2a	Neuroprosthetics	WMAI028-05	b, c	X		X		
2a-2b	First Year Project	WMCC027-15	*	*	*	*	X	X
2b	User-Centred Design [a]	WMCC025-05	a, c, d	X			X	
2b	Cognitive Neural Networks	WMCC022-05	a, f	X		X		
2b	Models of Human-Syntax Processing	WMCC014-05	e					
2b	Neuro-ergonomics	WMCC011-05	c, f				X	
2b	Collective Intelligence	WMAI023-05			X			
2b	Deep Learning Practical	WMAI034-05	g		X	X	X	
2b	Human-Robot Interaction for Social Robots	WMAI027-05	d	X		X	X	
2b	Natural Language Processing with Deep Learning	WMAI031-05	e		X	X		
Period	**Course**	**Course code**	**Course Units in Specialisation(s) and Pre-approved Electives (organized by Other Degree Programme)**					
2b	Language Technology Project [b]	LIX025M05	e				X	
Period	**Course**	**Course code**	**Pre-approved Electives (organized by Other Degree Programme)**					
1a-1b	Introduction Science and Policy	WMSE002-10					X	
1a	Introduction to Data Science	WMCS002-05	a		X			
1a, 2a	Skills in Science Communication	WMEC006-05					X	
1a	Scientific Visualization	WMCS018-05			X			
1a	Introduction Science and Business	WMSE001-10					X	
1a	Auditory and Visual Perception	WMBC002-05	a, c, d, f				X	
1a	Cloud Computing and Cloud-Based Applications	WMCS032-05				X	X	

			Learning outcomes of the degree programme					
			1	**2**	**3**	**4**	**5**	**6**
1a	Semantic Web Technology	LIX002M05	a, e		X			
1b	Applied Cognitive Neuroscience	PSMCB-4	a, f	X			X	
1b	Computer-Mediated Communication	LIX022M05	c, d				X	
1b	Philosophy of Neuroscience	FI184FR	a, f				X	
1b	Computational Semantics	LIX021M05	e			X		
2a	Corpus Linguistics	LTR024M05	e		X			
2a	Natural Language Processing	LIX001M05	e		X			
2a	User Interface Evaluation	LIX024M05	a, c, d				X	

[a] Course is part of specialisation: Human-Centred AI
[b] Course is part of specialisation: Human Language Modelling
[c] Course is part of specialisation: Cognitive Modelling and the Brain

* The learning outcomes in projects can differ depending on the type of project.