

	<u>Period 1</u>	<u>Period 2</u>	<u>Period 3</u>	<u>Period 4</u>
Mandatory	Methods in AI research		Philosophy of AI	
1st electives	Intelligent Agents ML for Human Vision and Language Computational Argumentation Data Mining	Advanced Machine Learning Cognitive Modeling Logic and Language Pattern recognition	Evolutionary Computing Experimentation in Psychology, Linguistics and AI Logic and Computation Multiagent systems	Human Centered Machine Learning Logics for Safe AI Multiagent learning Natural Language Processing Social computing
2nd electives Recommended	Adaptive interactive systems Applied Cognitive Psychology II Advanced cognitive and social psychology Foundations of sound patterns ICT advisory Multimedia retrieval Probabilistic Reasoning Program semantics and verification Reasoning about meaning in linguistic communication <sup>6</sup> Technologies for learning	Multimedia discourse interaction Topics in Philosophy of Mind Social and Affective Neuroscience (Topics in Epistemology and Philosophy of Science) Sound and music technology	Big data Computer Vision Digital Ethics ICT Entrepreneurship Natural Language Generation Neurocognition of Memory and Attention	AI for Game Technology Business Intelligence Cognitive and computational aspects of w Pattern set mining Philosophy of Neuroscience
2nd electives other	Algorithms for decision support Motion and manipulation Optimization and vectorization Scheduling & timetabling	Advanced graphics Concepts of program design Geometric algorithms Requirements engineering	Advanced functional programming Algorithms and networks Basic fMRI analysis Game physics Multimodal interaction Seminar Serious gaming Software architecture	Crowd Simulation Computer animation Compiler construction Data Intensive Systems Mobile interaction Network science

Research Internship: start possible every term, provided that a member of staff is willing to supervise and program coordinator has signed off on it

**Intelligent Systems:** mostly computer science courses with a strong focus on artificial agents, automated reasoning and machine learning. Many of these courses include system engineering.

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Mandatory	<b>Methods in AI research</b>		Philosophy of AI	
1st electives	<b>Intelligent Agents</b> ML for Human Vision and Language <b>Computational Argumentation</b> Data Mining	<b>Advanced Machine Learning</b> Cognitive Modeling Logic and Language <b>Pattern recognition</b>	<b>Evolutionary Computing</b> Experimentation in Psychology, Linguistics and AI Logic and Computation <b>Multiagent systems</b>	Human Centered Machine Learning <b>Logics for Safe AI</b> <b>Multiagent learning</b> <b>Natural Language Processing</b> Social computing
2nd electives Recommended	<b>Adaptive interactive systems</b> Applied Cognitive Psychology II Advanced cognitive and social psychology Foundations of sound patterns ICT advisory Multimedia retrieval <b>Probabilistic Reasoning</b> Program semantics and verification Reasoning about meaning in linguistic communication6 Technologies for learning	<b>Multimedia discourse interaction</b> Topics in Philosophy of Mind Social and Affective Neuroscience (Topics in Epistemology and Philosophy of Science)	Big data <b>Computer Vision</b> Digital Ethics ICT Entrepreneurship <b>Natural Language Generation</b> Neurocognition of Memory and Attention	Business Intelligence Cognitive and computational aspects of word meaning Pattern set mining Philosophy of Neuroscience <b>AI for Game Technology</b>
2nd electives other	<b>Algorithms for decision support</b> Motion and manipulation Optimization and vectorization Scheduling & timetabling	Advanced graphics Concepts of program design Geometric algorithms Sound and music technology Requirements engineering	Advanced functional programming Algorithms and networks Basic fMRI analysis Game physics Multimodal interaction Seminar Serious gaming Software architecture	<b>Crowd Simulation</b> Computer animation Compiler construction Mobile interaction Network science

**Cognitive agents:** A combination of computer science and cognitive science courses with a focus on human and artificial agents. Many of these courses include system engineering and experimentation.

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Mandatory	<b>Methods in AI research</b>		Philosophy of AI	
1st electives	<b>Intelligent Agents</b> <b>ML for Human Vision and Language</b> Computational Argumentation Data Mining	Advanced Machine Learning <b>Cognitive Modeling</b> Logic and Language Pattern recognition	Evolutionary Computing <b>Experimentation in Psychology, Linguistics and AI</b> Logic and Computation <b>Multiagent systems</b>	<b>Human Centered Machine Learning</b> Logics for Safe AI <b>Multiagent learning</b> Natural Language Processing <b>Social computing</b>
2nd electives Recommended	<b>Adaptive interactive systems</b> Applied Cognitive Psychology II <b>Advanced cognitive and social psychology</b> Foundations of sound patterns ICT advisory Multimedia retrieval Probabilistic Reasoning Program semantics and verification Reasoning about meaning in linguistic communication6 Technologies for learning	Multimedia discourse interaction Topics in Philosophy of Mind <b>Social and Affective Neuroscience</b> (Topics in Epistemology and Philosophy of Science)	Big data Computer Vision Digital Ethics ICT Entrepreneurship Natural Language Generation <b>Neurocognition of Memory and Attention</b>	Business Intelligence Cognitive and computational aspects of word meaning Pattern set mining <b>Philosophy of Neuroscience</b> AI for Game Technology
2nd electives other	Algorithms for decision support Motion and manipulation Optimization and vectorization Scheduling & timetabling	Advanced graphics Concepts of program design Geometric algorithms Sound and music technology Requirements engineering	Advanced functional programming Algorithms and networks Basic fMRI analysis Game physics Multimodal interaction Seminar Serious gaming Software architecture	Crowd Simulation Computer animation Compiler construction Mobile interaction Network science

**Reasoning agents:** Courses from formal philosophy and computer science, with a focus on computational aspects of agents and reasoning. Many of these courses involve formal logics or system engineering.

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Mandatory	Methods in AI research		Philosophy of AI	
1st electives	<b>Intelligent Agents</b> ML for Human Vision and Language <b>Computational Argumentation</b> Data Mining	Advanced Machine Learning Cognitive Modeling <b>Logic and Language</b> Pattern recognition	Evolutionary Computing Experimentation in Psychology, Linguistics and AI <b>Logic and Computation</b> <b>Multiagent systems</b>	Human Centered Machine Learning <b>Logics for Safe AI</b> <b>Multiagent learning</b> Natural Language Processing Social computing
2nd electives Recommended	Adaptive interactive systems Applied Cognitive Psychology II Advanced cognitive and social psychology Foundations of sound patterns ICT advisory Multimedia retrieval <b>Probabilistic Reasoning</b> <b>Program semantics and verification</b> Reasoning about meaning in linguistic communication6 Technologies for learning	Multimedia discourse interaction Topics in Philosophy of Mind Social and Affective Neuroscience (Topics in Epistemology and Philosophy of Science)	Big data Computer Vision Digital Ethics ICT Entrepreneurship <b>Natural Language Generation</b> Neurocognition of Memory and Attention	Business Intelligence Cognitive and computational aspects of word meaning Pattern set mining Philosophy of Neuroscience AI for Game Technology
2nd electives other	Algorithms for decision support Motion and manipulation Optimization and vectorization Scheduling & timetabling	Advanced graphics Concepts of program design Geometric algorithms Sound and music technology Requirements engineering	Advanced functional programming Algorithms and networks Basic fMRI analysis Game physics Multimodal interaction Seminar Serious gaming Software architecture	Crowd Simulation Computer animation Compiler construction Mobile interaction Network science

**Logic & Language:** Courses from formal philosophy and linguistics, with a focus on computational aspects of language and reasoning. Many of these courses involve formal logics.

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Mandatory	Methods in AI research		Philosophy of AI	
1st electives	Intelligent Agents ML for Human Vision and Language <b>Computational Argumentation</b> Data Mining	Advanced Machine Learning Cognitive Modeling <b>Logic and Language</b> Pattern recognition	Evolutionary Computing Experimentation in Psychology, Linguistics and AI <b>Logic and Computation</b> Multiagent systems	Human Centered Machine Learning Logics for Safe AI Multiagent learning <b>Natural Language Processing</b> Social computing
2nd electives Recommended	Adaptive interactive systems Applied Cognitive Psychology II Advanced cognitive and social psychology Foundations of sound patterns ICT advisory Multimedia retrieval Probabilistic Reasoning <b>Program semantics and verification</b> <b>Reasoning about meaning in linguistic communication</b> Technologies for learning	Multimedia discourse interaction Topics in Philosophy of Mind Social and Affective Neuroscience (Topics in Epistemology and Philosophy of Science)	Big data Computer Vision Digital Ethics ICT Entrepreneurship <b>Natural Language Generation</b> Neurocognition of Memory and Attention	Business Intelligence <b>Cognitive and computational aspects of word meaning</b> Pattern set mining Philosophy of Neuroscience AI for Game Technology
2nd electives other	Algorithms for decision support Motion and manipulation Optimization and vectorization Scheduling & timetabling	Advanced graphics Concepts of program design Geometric algorithms Sound and music technology Requirements engineering	Advanced functional programming Algorithms and networks Basic fMRI analysis Game physics Multimodal interaction Seminar Serious gaming Software architecture	Crowd Simulation Computer animation Compiler construction Mobile interaction Network science

**Cognition & Linguistics:** Linguistics and cognitive science courses with a focus on human intelligence and intelligent (linguistic) behaviour. Many of these courses involve empirical experimentation.

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Mandatory	<b>Methods in AI research</b>		Philosophy of AI	
1st electives	Intelligent Agents <b>ML for Human Vision and Language</b> Computational Argumentation Data Mining	Advanced Machine Learning <b>Cognitive Modeling</b> Logic and Language Pattern recognition	Evolutionary Computing <b>Experimentation in Psychology, Linguistics and AI</b> Logic and Computation Multiagent systems	Human Centered Machine Learning Logics for Safe AI Multiagent learning <b>Natural Language Processing</b> Social computing
2nd electives Recommended	Adaptive interactive systems <b>Applied Cognitive Psychology II</b> <b>Advanced cognitive and social psychology</b> <b>Foundations of sound patterns</b> ICT advisory Multimedia retrieval Probabilistic Reasoning Program semantics and verification <b>Reasoning about meaning in linguistic communication<sup>6</sup></b> Technologies for learning	Multimedia discourse interaction Topics in Philosophy of Mind <b>Social and Affective Neuroscience</b> (Topics in Epistemology and Philosophy of Science)	Big data Computer Vision Digital Ethics ICT Entrepreneurship Natural Language Generation <b>Neurocognition of Memory and Attention</b>	Business Intelligence <b>Cognitive and computational aspects of word meaning</b> Pattern set mining Philosophy of Neuroscience AI for Game Technology
2nd electives other	Algorithms for decision support Motion and manipulation Optimization and vectorization Scheduling & timetabling	Advanced graphics Concepts of program design Geometric algorithms Sound and music technology Requirements engineering	Advanced functional programming Algorithms and networks Basic fMRI analysis Game physics Multimodal interaction Seminar Serious gaming Software architecture	Crowd Simulation Computer animation Compiler construction Mobile interaction Network science

**Philosophy & social AI:** Courses from philosophy and computer science, with a focus on the philosophical and social aspects of AI.

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Mandatory	Methods in AI research		<b>Philosophy of AI</b>	
1st electives	Intelligent Agents ML for Human Vision and Language Computational Argumentation Data Mining	Advanced Machine Learning Cognitive Modeling Logic and Language Pattern recognition	Evolutionary Computing Experimentation in Psychology, Linguistics and AI Logic and Computation Multiagent systems	<b>Human Centered Machine Learning</b> Logics for Safe AI Multiagent learning Natural Language Processing <b>Social computing</b>
2nd electives Recommended	Adaptive interactive systems Applied Cognitive Psychology II Advanced cognitive and social psychology Foundations of sound patterns ICT advisory Multimedia retrieval Probabilistic Reasoning Program semantics and verification Reasoning about meaning in linguistic communication6 Technologies for learning	Multimedia discourse interaction <b>Topics in Philosophy of Mind</b> Social and Affective Neuroscience (Topics in Epistemology and Philosophy of Science)	Big data Computer Vision <b>Digital Ethics</b> ICT Entrepreneurship Natural Language Generation Neurocognition of Memory and Attention	Business Intelligence Cognitive and computational aspects of word meaning Pattern set mining <b>Philosophy of Neuroscience</b> AI for Game Technology
2nd electives other	Algorithms for decision support Motion and manipulation Optimization and vectorization Scheduling & timetabling	Advanced graphics Concepts of program design Geometric algorithms Sound and music technology Requirements engineering	Advanced functional programming Algorithms and networks Basic fMRI analysis Game physics Multimodal interaction Seminar Serious gaming Software architecture	Crowd Simulation Computer animation Compiler construction Mobile interaction Network science

**Machine learning:** Courses that focus on Machine Learning and Data Science applications, many of these courses include system engineering.

	<u>Period 1</u>	<u>Period 2</u>	<u>Period 3</u>	<u>Period 4</u>
Mandatory	Methods in AI research		Philosophy of AI	
1st electives	Intelligent Agents <b>ML for Human Vision and Language</b> Computational Argumentation <b>Data Mining</b>	<b>Advanced Machine Learning</b> Cognitive Modeling Logic and Language <b>Pattern recognition</b>	<b>Evolutionary Computing</b> Experimentation in Psychology, Linguistics and AI Logic and Computation Multiagent systems	<b>Human Centered Machine Learning</b> Logics for Safe AI <b>Multiagent learning</b> <b>Natural Language Processing</b> Social computing
2nd electives Recommended	Adaptive interactive systems Applied Cognitive Psychology II Advanced cognitive and social psychology Foundations of sound patterns ICT advisory <b>Multimedia retrieval</b> Probabilistic Reasoning Program semantics and verification Reasoning about meaning in linguistic communication6 Technologies for learning	<b>Multimedia discourse interaction</b> Topics in Philosophy of Mind Social and Affective Neuroscience (Topics in Epistemology and Philosophy of Science)	<b>Big data</b> <b>Computer Vision</b> Digital Ethics ICT Entrepreneurship Natural Language Generation Neurocognition of Memory and Attention	<b>Business Intelligence</b> Cognitive and computational aspects of word meaning <b>Pattern set mining</b> Philosophy of Neuroscience <b>AI for Game Technology</b>
2nd electives other	Algorithms for decision support Motion and manipulation Optimization and vectorization Scheduling & timetabling	Advanced graphics Concepts of program design Geometric algorithms Sound and music technology Requirements engineering	Advanced functional programming Algorithms and networks Basic fMRI analysis Game physics Multimodal interaction Seminar Serious gaming Software architecture	Crowd Simulation Computer animation Compiler construction Mobile interaction Network science