Modulhandbuch für den

Master of Science Kognitionswissenschaft

an der Fakultät für Psychologie der Ruhr-Universität Bochum

Module manual for the

Master of Science, Cognitive Science

at the Faculty of Psychology of the Ruhr-Universität Bochum

Fakultät für Psychologie

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General Information

Course Guidance

The study advice for students in the Master program in Cognitive Science is provided by employees of the Dean's Office and the Examination Office of the Faculty of Psychology:

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In addition, the university lecturers are available at regular and/or freely arranged appointments and advise students on questions relating to the respective subject. Information on this can be found on the website of the Master program Cognitive Science: https://philosophy-cognition.com/mcs/research-of-collaborating-institutes/. Finally, students can also turn to the Faculty of Psychology's Student Council for advice: Building IB, Level 01, Room 101, fsr-psychologie@ruhr-uni-bochum.de.

Methodological Advice

In addition, students are offered methodological advice, where they can receive individual advice on the various steps of quantitative studies, from study planning to data analysis. At the same time, there is also an open data meeting, where students can analyze their data, exchange ideas with others and turn to the advisors with questions about data analysis, provided they are not currently in a consultation. Information on the advice offered by the methodology department can be found at: http://www.pml.psy.rub.de/methodenberatung/index.html.de.

Course Plan M.Sc. Cognitive Science

	1.Semester	2.Semester	3.Semester	4.Semester	CP
Introduction (12 CP)					12
Introduction to Cognitive Science (6 CP)	L+S, 3+3 CP				
Soft Skills Module (6 CP)	S+S, 3+3 CP				
Basic Methods (12 / 18 CP)*					12 / 18*
Introduction to Philosophical Method (6 CP)	L+S, 3+3 CP				
Introduction to Programming (6 CP)	L+P, 3+3 CP				
Introduction to Statistics (6 CP)	L+S, 3+3 CP				
Core (27 CP)					27
Core Module ML (9 CP)		L+S+S, 3+3+3 CP			
Core Module BB (9 CP)		L+S+S, 3+3+3 CP			
Core Module CA (9 CP)		L+S+S, 3+3+3 CP			
Focus (18 CP)**					18**
Focus Module ML (9 CP)			L+S+S, 3+3+3 CP		
Focus Module BB (9 CP)			L+S+S, 3+3+3 CP		
Focus Module CA (9 CP)			L+S+S, 3+3+3 CP		
Research (39 CP)					39
Research Module (9 CP)			S+P, 9 CP		
Master thesis (30 CP)				Thesis	
Subtotal	**24-30 CP**	**27 CP**	**27 CP**	**30 CP**	
Free Choice: (6 / 12 CP)* semester 1-3					6 / 12*
Choice I (6 CP)		**3 CP**	**3 CP**		
Choice II (6 CP)	**0-6 CP**				
Sum					**120 CP**

L: lecture; S: seminar; P: practical course; ML: Mind & Language; BB: Brain & Behavior; CA: Computation and Artificial Intelligence.

* Students must take two or three methods modules depending on their academic background. In the former case, one additional module (6 CP) must be taken in Free Choice. For achieving exactly 30 CP each semester, students can take one 3 CP course in the second semester and one 3 CP course in the third semester.

** Students must select two of the three Focus Modules (9 CP) for a total of 18 CP.

Concept of Modularization

The M.Sc. Cognitive Science is subject to the curricular organizational principle of modularization. Modules represent self-contained, thematically and temporally rounded partial qualifications or study units, which together form the overall profile of the degree program and guide the design of the curriculum. The modules also provide the basis to allow for flexible specialization along with the breadth of an interdisciplinary MSc (see section Interdisciplinarity). The course plan represents the ideal order of the modules; however, this order of the modules is not a requirement. Exceptions can be specified in the course description for individual in-depth courses; this applies in particular to passing the Basic Methods.
The modules, which are usually brought to a standard size of 6-9 ECTS, can consist of various teaching and learning forms (e.g. lectures, exercises, internships, teaching research, etc.). They comprise one to two semesters of related teaching events, which always end with an examination. The examination content and form are based on the learning outcomes defined for the module.
One common module type consists of a lecture and one or two seminars. The lecture presents an overview of a topic and provides a demonstration of excerpts, while the seminars can focus on more in-depth topics. The teaching format of a lecture is the presentation, while a seminar uses student presentations including discussion, interactive tasks or homework as the primary teaching method. The seminars thus offer students a wide range of opportunities to practice their presentation skills and, thanks to the discursive elements, to improve their ability to argue scientifically and communicate competently.
Overall, the modules are considered to have been successfully completed as soon as the associated module examination and the other requirements defined for the award of credit points have been successfully completed. The course of study shown in the study plan represents the ideal order for completing the modules.
In addition to the compulsory modules provided for in the curriculum, 6-12 credit points must also be acquired in Free Selection so that students can choose to sharpen their individual profile and focus. The exact number of CP depends on the required Methods modules, which in turn depends on the student's academic background.

Interdisciplinarity & Specialization

Cognitive Science is an interdisciplinary program, and the curricular structure is designed with the aim of providing a broad background along with the option for specialization. In the first semester the module 'Introduction to Cognitive Science' provides a broad and interdisciplinary overview over the subject Cognitive Science and introduces the persons involved in the program at Ruhr University. The Fields 'Core' and 'Focus' structure the selection of specific subject areas. Here all courses are organized into three main pillars: Mind & Language (ML), Brain & Behavior (BB), Computation & Artificial Intelligence (CA). All students shall gain general understanding of all three pillars in the Core Modules (9 CP each) and prioritize two pillars for specialization in the Focus Modules (9 CP each).

To provide a broad methods understanding to students from different disciplines, the field Basic Methods introduces the central methods of the disciplines in Cognitive Science. If a student already has sufficient background in an area, one of the three modules can be dropped in agreement with the Program Coordinator and the 6 CP can be added as a second module to Free Selection.

Assessments

All examinations are completed during the course of study. The course leaders determine the type of examination for their course and announce this at the beginning of their course. An examination can be a written exam (on paper or as an electronic exam), a seminar contribution, a written report, an oral exam or a multiple-choice exam.

Reference to the Examination Regulations

The examination regulations for the M.Sc. Cognitive Science can be viewed on the website of the Department of Psychology: https://www.psy.ruhr-uni-bochum.de/psy/studium/pruefungsordnungen.html.de.

Below you will find a description of the individual modules of the M.Sc. Cognitive Science.

Field: Introduction

Nr.: CS	Credits	Workload	Semester	Frequency	Duration
	6 CP	180 h	1. Sem.	WS	1 Semester

Course Type	Contact Hours	Self Study	Group Size
a) Lecture	30 h	60 h	approx. 25
b) Seminar	30 h	60 h	

Module: Introduction to Cognitive Science

Learning Outcomes

Course Competences: The students are introduced to the various disciplines, goals and methods that make up Cognitive Science through a historic and systematic overview of the field. Some core research topics are presented from the different paradigms constituting Cognitive Science.
Social Competences: Learning in groups (Lecture); Collaborating in groups (Seminar)
Methodological Competences: The module presents and discusses Cognitive Science core methods.
Individual Competences: Independent acquisition of knowledge with the help of different media; Time management; Self-positioning in a group

Content

Cognitive Science is the interdisciplinary study of cognition in living and complex mechanical systems. Cognition includes mental states and processes such as thinking, reasoning, language understanding, communication, perception, learning, memory, consciousness, emotions, etc. This introductory lecture is intended to provide students with an overview of central paradigms and methods of the relevant disciplines, such as psychology, philosophy, computational modeling and neuroscience. These will then be dealt with (and applied) more extensively in the corresponding seminars. One focus of the lectures will also be the introduction to the conceptual foundations for Cognitive Science, i.e. the conception of cognition as information processing, and the development that this young interdisciplinary project has undergone over the last 50 years. That is, in a first part the lecture will include a presentation of the continuities and discontinuities, beginning with the classical computer model of the mind, differences between symbolic and connectionist mental architectures, the impact of developmental systems theory and the importance of an embodied and embedded Cognitive Science as well as dynamic system theory. Furthermore, it is intended to provide an introduction to some current research issues in Cognitive Science concerning e.g. perception, action, memory, learning and reasoning from different research paradigms by which they are investigated. Thus, the inherently interdisciplinary nature of the subject is presented and reflected in the course. In the complementary seminar the students will deepen and apply their knowledge on the topics of the lecture in practical group settings.

Teaching Methods

The lecture focuses on presentation and discussion of central topics. The seminar focuses on discussions of original texts related to the lecture and introduction to practical techniques.

Assessment

Lecture: Written Exam (90 min); Seminar: Active Contribution.

Assessment Prerequisites

Regular attendance in the seminar (66%), active participation in the seminar, successful completion of RightCite (Soft Skills module).

Role of the Module (in other study degrees)

Contribution to the Overall Grade

The grade of the module assessment contributes weighted by the CP of the module.

Responsible Person

Rose

Further Information

Field: Introduction

Nr.: SSk	Credits	Workload	Semester	Frequency	Duration
	6 CP	180 h	1. Sem.	WS	1 Semester

Course Type	Contact Hours	Self Study	Group Size
a) Seminar	60 h	90 h	approx. 25
b) eLearning course	0 h	30 h	

Module: Soft Skills

Learning Outcomes

Course Competences: Acquisition of intercultural competence. Understanding good scientific practice. Language competency. Learning to navigate the German academic system.
Social Competences: Learning in groups; Collaborating in groups (Seminar)
Methodological Competences: Academic writing including scientific citation.
Individual Competences: Independent acquisition of knowledge with the help of different media; Time management; Self-positioning in a group

Content

eLearning course on plagiarism and correct scientific citation (RightCite).
Onboarding seminar for (international) students.
Seminar on scientific writing.

Teaching Methods

Tutoring; Self-taught eLearning; Essay writing including feedback; Excursions; Socializing events;

Assessment

RightCite: Online quiz; Onboarding Seminar: Active Contribution & Online Quiz. Seminar on scientific writing: Written essay (module grade)

Assessment Prerequisites

Regular attendance and active participation in the seminars.

Role of the Module (in other study degrees)

Contribution to the Overall Grade

The grade of the module assessment contributes weighted by the CP of the module.

Responsible Person

Krauß

Further Information

Field: Basic Methods

Nr.: BM-PM	Credits	Workload	Semester	Frequency	Duration
	6 CP	180 h	1. Sem.	WS	1 Semester
Course Type			**Contact Hours**	**Self Study**	**Group Size**
a) Lecture + Tutorial			60 h	120 h	approx. 25

Module: Introduction to Philosophical Method

Learning Outcomes

Course Competences: Students obtain an overview of classical logic and gain insight into problems from philosophical logic and some bridges from logic to cognition. They acquire basic competences in the formal analysis of the notions of, for example, inference, belief, and knowledge.

Social Competences: The students will learn to work on exercises, ideally in small study groups which support and stimulate discussion and co-operation.

Methodological Competences: The lecture of this module will convey to the students a number of important informal and formal methods, including conceptual analysis as applied in philosophy, the formal reconstruction of part of natural language discourse, inductive definitions, truth tables, the axiomatic method, natural deduction, the methods of direct and indirect proof, and the application of so-called possible worlds models. The competences will be carefully motivated, explained, and will be practically developed by means of exercises.

Individual Competences: Students will sharpen their analytical competences by working on exercises from logic and they will practice seminar presentations and/or the writing of essays. For the latter purpose, they will rehearse the reading of standard textbooks and recent research papers.

Content

Logic is the theory of valid inference and as such it is of fundamental importance for our understanding of information processing and cognition. It brings together problems and methods from philosophy, linguistics, knowledge representation, and other neighboring disciplines. The module will provide basic knowledge of classical logic as well as essentials of philosophical logic. The presentation of classical logic comprises the formal languages of propositional and first-order logic and their elementary model theory and proof theory. As a result, the module deals with problems ranging from how to characterize valid arguments and logical inferences to the definition and role of the notion of knowledge. Moreover, the discussion of the role of logic in cognition will be characterized.

Teaching Methods

The courses are organized as lectures that are accompanied by an optional tutorial. The tutorial provides a framework of support for completing exercises and learning the material.

Assessment

Weekly exercises and written exams

Assessment Prerequisites

Regular attendance in tutorials (66%, can be subject to department-specific variations), successful completion of exercises and active participation.

Role of the Module (in other study degrees)

Contribution to the Overall Grade

The grade of the module assessment contributes weighted by the CP of the module.

Responsible Person

Newen

Further Information

This module introduces one of three basic methods.

Field: Basic Methods

Nr.: BM-P	Credits	Workload	Semester	Frequency	Duration
	6 CP	180 h	1. Sem.	WS	1 Semester
Course Type			**Contact Hours**	**Self Study**	**Group Size**
Lecture + Exercises/ Seminar/ Practical Course			60 h	120 h	approx. 25

Module: Introduction to Programming

Learning Outcomes

Course Competences: Students will learn a programming language.
Social Competences: Students will work in small groups to learn problem solving in a group.
Methodological Competences: Designing, writing, reading and debugging code.
Individual Competences: Students learn fundamental programming skills used in experiments, analysis and modelling in Cognitive Science.

Content

Programming is a fundamental skill in Cognitive Science that is required in many of the underlying disciplines. In experimental subjects it is crucial for conducting experiments and analyzing the resulting data, in theoretical subjects it can be critical for the generation of models. Tools in artificial intelligence and computer linguistics are realized in programming languages. This module forms the basis of learning to master this critical skill.

Teaching Methods

A lecture/seminar is used to teach new concepts; these are then applied in exercises.

Assessment

Presentation of exercises and results, dependent on course an essay or exam.

Assessment Prerequisites

Regular attendance in exercises, seminars and practical courses (66%, can be subject to department-specific variations), active participation in the seminar, successful completion of the exercises.

Role of the Module (in other study degrees)

Some courses of this module will also be offered in the M.Sc. Psychology, specializing in Cognitive Neuroscience.

Contribution to the Overall Grade

The grade of the module assessment contributes weighted by the CP of the module.

Responsible Person

Rose

Further Information

This module introduces one of three basic methods.

Field: Basic Methods

Nr.: BM-S	Credits	Workload	Semester	Frequency	Duration
	6 CP	180 h	2. Sem.	SS	1 Semester
Course Type			**Contact Hours**	**Self Study**	**Group Size**
Lecture + Exercises/ Seminar			60 h	120 h	approx. 25

Module: Introduction to Statistics

Learning Outcomes

Course Competences: Students will learn about the statistical methods most commonly used by researchers in Cognitive Science.

Social Competences: Students will be encouraged to work in small groups to learn problem solving in a group.

Methodological Competences: Application of statistical methods to data and evaluation of the validity of these methods when applied by others.

Individual Competences: The content of this course helps the students to design, analyze and interpret their own experiments.

Content

This course will cover the basic statistical methods used in Cognitive Science to summarize, analyze, and draw conclusions from data. The topics include descriptive statistics, statistical tests, and experimental design.

Teaching Methods

Statistics will be taught in lectures with homework assignments.

Assessment

Graded homework assignment and/ or written final exam.

Assessment Prerequisites

Regular attendance in exercises and seminars (66%), active participation, successful completion of the assignments.

Role of the Module (in other study degrees)

Contribution to the Overall Grade

The grade of the module assessment contributes weighted by the CP of the module.

Responsible Person

Rose

Further Information

This module introduces one of three basic methods.

Field: Core

Nr.: CM-BB	Credits	Workload	Semester	Frequency	Duration
	9 CP	270 h	2. Sem.	SS	1 Semester

Course Type	Contact Hours	Self Study	Group Size
a) Lecture	30 h	60 h	approx. 25
b) Seminar	30 h	60 h	
c) Seminar	30 h	60 h	

Module: Core Module Brain & Behavior

Learning Outcomes

Course Competences: Students develop a basic understanding of cognitive, behavioral and neuroscientific topics including different approaches to studying brain and behavior.

Social Competences: Students will be encouraged to work in small groups to learn problem solving in a group. Students will learn to give professional presentations for an audience of Master students (Seminar).

Methodological Competences: Students learn how to critically evaluate experiments, models or theories.

Individual Competences: Students learn to read and understand the relevant scientific literature. They learn how to provide and work with criticism in a constructive way.

Content

This module offers classes that present the Cognitive Science of brain and behavior. One of the fundamental aims of this module is to combine the wet world of neurobiology with the dry world of experimental psychology. This includes courses focusing on perception, action, memory, and decision making or the specific interactions between the systems. One compulsory seminar in this module is the Experimental Psychology Lab which aims to teach the foundations of conducting experiments in cognitive psychology and neuroscience.

Teaching Methods

The courses are organized as seminars or lectures, this can be subject to department-specific variations. The lectures focus on the presentation and discussion of the central topics. The seminars consist of student presentations and discussions of the original texts in relation to the lecture.

Assessment

Typically: Written exam, oral presentation, or written essay.

Assessment Prerequisites

Regular attendance in the seminars (66%, can be subject to department-specific variations), active participation in the seminars.

Role of the Module (in other study degrees)

Some courses of this module will also be offered in the M.Sc. Cognitive Neuroscience.

Contribution to the Overall Grade

The grade of the module assessment contributes weighted by the CP of the module.

Responsible Person

Rose

Further Information

Field: Core

Nr.: CM-ML	Credits	Workload	Semester	Frequency	Duration
	9 CP	270 h	2. Sem.	SS	1 Semester

Course Type	Contact Hours	Self Study	Group Size
a) Lecture/Seminar	30 h	60 h	approx. 25
b) Seminar	30 h	60 h	
c) Seminar	30 h	60 h	

Module: Core Module Mind & Language

Learning Outcomes

Course Competences: Students develop a basic understanding of philosophy of mind and linguistics including different approaches to studying mind and language.
Social Competences: Students will be encouraged to work in small groups to learn problem solving in a group. Students will learn to give professional presentations for an audience of Master students (seminar).
Methodological Competences: Students learn how to critically evaluate theories, models or experiments.
Individual Competences: Students learn to read and understand the relevant scientific literature. They learn how to provide and work with criticism in a constructive way.

Content

This module offers classes that present the Cognitive Science of mind and language. One of the fundamental aims of this module is to combine the world of empirical studies with the theoretical world of philosophy. This includes courses focusing on language, semantics, situated cognition, theory of mind, comparative cognition and logic.

Teaching Methods

The courses are organized as seminars or lectures, this can be subject to department-specific variations. The lectures focus on the presentation and discussion of the central topics. The seminars consist of student presentations and discussions of the original texts in relation to the lecture.

Assessment

Typically: Written exam, oral presentation, or written essay.

Assessment Prerequisites

Regular attendance in the seminars (66%, can be subject to department-specific variations), active participation in the seminars.

Role of the Module (in other study degrees)

Some courses of this module will also be offered in the M.A. Philosophy.

Contribution to the Overall Grade

The grade of the module assessment contributes weighted by the CP of the module.

Responsible Person

Newen

Further Information

Field: Core

Nr.: CM-CA	Credits	Workload	Semester	Frequency	Duration
	9 CP	270 h	2. Sem.	SS	1 Semester

Course Type	Contact Hours	Self Study	Group Size
a) Lecture + Exercise	60 h	120 h	approx. 25
b) Seminar/Practical Course	30 h	60 h	
c) Seminar/Practical Course	30 h	60 h	

Module: Core Module Computation & Artificial Intelligence

Learning Outcomes

Course Competences: Students develop a basic understanding of relevant algorithms and computational modelling and analyses including, for instance, neural networks, machine and deep learning.

Social Competences: Students will be encouraged to work in small groups to learn problem solving in a group. Students will learn how to communicate code and coding problems.

Methodological Competences: Students will understand and learn to implement relevant algorithms mathematically and programmatically.

Individual Competences: Students learn to read and understand the relevant literature. They learn how to provide and work with criticism in a constructive way.

Content

This module offers classes that present the computational aspects of Cognitive Science and artificial intelligence. One of the fundamental aims of this module is to combine the world of empirical studies and philosophical theory with applied computational implementations. This includes courses focusing on data analysis, machine learning, neural networks, neurophysiological models.

Teaching Methods

The courses are organized as lectures with practical exercises or seminars, this can be subject to department-specific variations. The lectures focus on the presentation and discussion of the central topics. The exercises consist of practical implementations and student presentations and discussions thereof.

Assessment

Typically: Written exam, practical assignments.

Assessment Prerequisites

Regular attendance in exercises, seminars and practical courses, active participation in the exercise (see Teaching Methods).

Role of the Module (in other study degrees)

Contribution to the Overall Grade

The grade of the module assessment contributes weighted by the CP of the module.

Responsible Person

Schmidt

Further Information

Field: Focus

Nr.: FM-BB	Credits	Workload	Semester	Frequency	Duration
	9 CP	270 h	3. Sem.	WS	1 Semester
Course Type a) Lecture/ Seminar/ Practical Course/ Colloquium			**Contact Hours** 90 h	**Self Study** 180 h	**Group Size** approx. 25

Module: Focus Module Brain & Behavior

Learning Outcomes

Course Competences: Students develop a focus in cognitive, behavioral and neuroscientific questions when dealing with interdisciplinary approaches. They develop skills in interdisciplinary research and problem solving and become acquainted with high-level publications and research talks of invited researchers during lecture series or workshops.

Social Competences: Advanced group discussions about interdisciplinary problems with people from different scientific backgrounds. Learning to collaborate with people from different scientific backgrounds.

Methodological Competences: Students develop skills in interdisciplinary research and problem solving and become acquainted with listening to high-level research talks of invited researchers during lecture series or workshops.

Individual Competences: Students learn to situate their research among different academic disciplines and address complex topics from multiple perspectives.

Content

All students must choose two of the available three Focus Modules.

This module exposes students to the cutting edge of research. The overall aim of this focus module is to understand up-to-date cognitive behavioral and neuroscientific investigations in the combination of methodological design of an experiment, statistical analysis and high-level training in the interpretation of experimental results will be the core of this module. Given the nature of the program this focus will be enriched by its intrinsic interaction with methods in psychology, anthropology, neuroscience, and animal cognition.

Teaching Methods

The courses are organized as seminars, colloquia or lectures. The lectures focus on the presentation and discussion of advanced research problems related to the topic of interest. The seminars consist of student presentations and discussions (while colloquia include also guest presentations).

Assessment

Typically: Written exam, oral presentation, or written essay.

Assessment Prerequisites

Regular attendance in seminars, practical courses and colloquia (66%, can be subject to department-specific variations), active participation in the seminars.

Role of the Module (in other study degrees)

Some courses of this module will also be offered in the M.Sc. Psychology, specializing in Cognitive Neuroscience.

Contribution to the Overall Grade

The grade of the module assessment contributes weighted by the CP of the module.

Responsible Person

Rose

Further Information

Field: Focus

Nr.: FM-ML	Credits	Workload	Semester	Frequency	Duration
	9 CP	270 h	3. Sem.	WS	1 Semester
Course Type a) Lecture/ Seminar/ Exercise/ Colloquium			**Contact Hours** 90 h	**Self Study** 180 h	**Group Size** approx. 25

Module: Focus Module Mind & Language

Learning Outcomes

Course Competences: Students develop a focus in philosophy of mind and linguistics including different approaches to studying mind and language. They develop skills in interdisciplinary research and problem solving and become acquainted with high-level publications and research talks of invited researchers during lecture series or workshops.

Social Competences: Advanced group discussions about interdisciplinary problems with people from different scientific backgrounds. Learning to collaborate with people from different scientific backgrounds.

Methodological Competences: Students develop skills in interdisciplinary research and problem solving and become acquainted with listening to high-level research talks of invited researchers during lecture series or workshops.

Individual Competences: Students learn to situate their research among different academic disciplines and address complex topics from multiple perspectives.

Content

All students must choose two of the available three Focus Modules.

This module exposes students to the cutting edge of research. The overall aim of this focus module is to understand up-to-date theories and concepts in philosophy and linguistics. Philosophical theory formation will be presented and trained intensely, and integrated with other theoretical endeavors, especially in linguistics, psychology and neuroscience. Given the nature of the program this focus will be enriched by its intrinsic interaction with the empirical work of Cognitive Science.

Teaching Methods

The courses are organized as seminars, colloquia or lectures. The lectures focus on the presentation and discussion of advanced research problems related to the topic of interest. The seminars consist of student presentations and discussions (while colloquia include also guest presentations).

Assessment

Typically: Written exam, oral presentation, or written essay.

Assessment Prerequisites

Regular attendance in seminars, exercises and colloquia (66%, can be subject to department-specific variations), active participation in the seminars.

Role of the Module (in other study degrees)

Some courses in the module will be also offered in the M.A. philosophy.

Contribution to the Overall Grade

The grade of the module assessment contributes weighted by the CP of the module.

Responsible Person

Newen

Further Information

Field: Focus

Nr.: FM-CA	Credits	Workload	Semester	Frequency	Duration
	9 CP	270 h	3. Sem.	WS	1 Semester
Course Type a) Lecture/ Seminar/ Practical Course/ Colloquium			**Contact Hours** 60 h 30 h	**Self Study** 120 h 60 h	**Group Size** approx. 25

Module: Focus Module Computation & Artificial Intelligence

Learning Outcomes

Course Competences: Students develop a focused understanding of relevant algorithms, computational models and analyses, for instance neural networks, machine and deep learning when dealing with interdisciplinary approaches. They develop skills in interdisciplinary research and problem solving and become acquainted with high-level publications and research talks of invited researchers during lecture series or workshops.

Social Competences: Advanced group discussions about interdisciplinary problems with people from different scientific backgrounds. Learning to collaborate with people from different scientific backgrounds.

Methodological Competences: Students develop skills in interdisciplinary research and problem solving and become acquainted with listening to high-level research talks of invited researchers during lecture series or workshops.

Individual Competences: Students learn to situate their research among different academic disciplines and address complex topics from multiple perspectives.

Content

All students must choose two of the available three Focus Modules.

This module exposes students to the cutting edge of research. The overall aim of this Focus Module is to understand up-to-date computational approaches in Cognitive Science including modern artificial intelligence, data analysis, machine learning, neural networks and neurophysiological models.

Teaching Methods

The courses are organized as seminars, colloquia or lectures. The lectures focus on the presentation and discussion of advanced research problems related to the topic of interest. The seminars consist of student presentations and discussions (while colloquia include also guest presentations).

Assessment

Typically: Written exam, oral presentation, or written essay.

Assessment Prerequisites

Regular attendance in seminars, practical courses and colloquia, active participation in the seminars, successful completion of the assessments.

Role of the Module (in other study degrees)

Contribution to the Overall Grade

The grade of the module assessment contributes weighted by the CP of the module.

Responsible Person

Schmidt

Further Information

Field: Free Choice

Nr.: FC-1	Credits 6 CP	Workload 180 h	Semester 1.-3. Sem.	Frequency	Duration 1 Semester
Course Type Any			**Contact Hours** 60 h	**Self Study** 120 h	**Group Size**

Module: Choice 1

Learning Outcomes

Course Competences: Students learn to integrate different approaches to study cognitive phenomena on a high research level combining knowledge of experimental results, computational models, behavioral studies, cognitive models and philosophical theories. In the case of an internship, students are allowed to use this module to learn one scientific method intensely as a preparation for using it in the Master project. Also, in this case an interdisciplinary perspective is part of the training.
Social Competences: Advanced group discussions about interdisciplinary problems with people with different scientific backgrounds; learning to collaborate with people with different scientific backgrounds. In the case of an internship: intense cooperation in small teams of 3-5 people.
Methodological Competences: In seminars or lectures they complete their competence in interdisciplinary research in Cognitive Science. In colloquia, they develop skills in interdisciplinary research and problem solving and become acquainted with listening to high-level research talks of invited researchers during lecture series or workshops. In the case of an internship the module has the aim to foster a training in learning a scientific method that is necessary for the Master project of the student.
Individual Competences: Students can specialize within the interdisciplinary field of Cognitive Science. They learn to participate in research discussions based on state-of-the-art presentations in Cognitive Science.

Content

The nature of this module is such that the content is not constrained. Students can freely choose the topics within the field of Cognitive Science. They are recommended to choose those topics that complement their education or directly support the preparation of the Master thesis.

Teaching Methods

The teaching methods depend on the courses selected by the students.

Assessment

The assessment depends on the courses selected by the students.

Assessment Prerequisites

The assessment prerequisites depend on the courses selected by the students.

Role of the Module (in other study degrees)

Some courses of this module will also be offered in the M.Sc. Psychology, specializing in Cognitive Neuroscience, or in the M.A. Philosophy.

Contribution to the Overall Grade

The grade of the module assessment contributes weighted by the CP of the module.

Responsible Person

The responsible person depends on the courses selected by the students.

Further Information

Field: Free Choice

Nr.: FC-2	Credits 6 CP	Workload 180 h	Semester 1.-3. Sem.	Frequency	Duration 1 Semester
Course Type Any			**Contact Hours** 60 h	**Self Study** 120 h	**Group Size**

Module: Choice 2

Learning Outcomes

Course Competences: Students learn to integrate different approaches to study cognitive phenomena on a high research level combining knowledge of experimental results, computational models, behavioral studies, cognitive models and philosophical theories. In the case of an internship, students are allowed to use this module to learn one scientific method intensely as a preparation for using it in the Master project. Also, in this case an interdisciplinary perspective is part of the training.
Social Competences: Advanced group discussions about interdisciplinary problems with people with different scientific backgrounds; learning to collaborate with people with different scientific backgrounds. In the case of an internship: intense cooperation in small teams of 3-5 people.
Methodological Competences: In seminars or lectures they complete their competence in interdisciplinary research in Cognitive Science. In colloquia, they develop skills in interdisciplinary research and problem solving and become acquainted with listening to high-level research talks of invited researchers during lecture series or workshops. In the case of an internship the module has the aim to foster a training in learning a scientific method that is necessary for the Master project of the student.
Individual Competences: Students can specialize within the interdisciplinary field of Cognitive Science. They learn to participate in research discussions based on state-of-the-art presentations in Cognitive Science.

Content

The nature of this module is such that the content is not constrained. Students can freely choose the topics within the field of Cognitive Science. They are recommended to choose those topics that complement their education or directly support the preparation of the Master thesis.

Teaching Methods

The teaching methods depend on the courses selected by the students.

Assessment

The assessment depends on the courses selected by the students.

Assessment Prerequisites

The assessment prerequisites depend on the courses selected by the students.

Role of the Module (in other study degrees)

Some courses of this module will also be offered in the M.Sc. Psychology, specializing in Cognitive Neuroscience, or in the M.A. Philosophy.

Contribution to the Overall Grade

The grade of the module assessment contributes weighted by the CP of the module.

Responsible Person

The responsible person depends on the courses selected by the students.

Further Information

This module can be taken by students who take 2 out of 3 Basic Methods due to their proficiency in the third Basic Method based on their academic background.

Field: Research

Nr.: RM	Credits	Workload	Semester	Frequency	Duration
	9 CP	270 h	3. Sem.	WS	1 Semester

Course Type	Contact Hours	Self Study	Group Size
a) Research talks + thesis proposal	10 h	80 h	approx. 25
b) Internship	0 h	180 h (/90 h)	approx. 25
c) Colloquium (optional)	(30 h)	(60 h)	approx. 25

Module: Research Module

Learning Outcomes

Course Competences: They find a relevant subject of Cognitive Science for conducting the research for the final thesis and gain practical experience in the relevant group. Students demonstrate the ability to write a research proposal that meets scientific standards.
Social Competences: Working under supervision to prepare for the Master thesis.
Methodological Competences: Students gain experience with the research methods relevant for the Master thesis. They learn how to write and communicate a research proposal in written English
Individual Competences: Students find and develop a thesis topic with their thesis supervisor.

Content

This module provides students with the scientific framework and insight into the practical background for planning the upcoming Master thesis. Upon completion of the module, they will write a Master thesis proposal.
Internships: Students complete a research internship, or a research seminar in philosophy. The internship takes place in an experimental or theoretical group in a field of Cognitive Science or, in exceptional cases, in a relevant company. The aim of the internship is to prepare the student for conducting the research project for the Master thesis. Internships can be 90 or 180 hours, in the former case either two internships must be completed, or an additional colloquium (3CP) must be attended.
Research talks: Here students attend scientific talks (10 h) in the framework of conferences, workshops, colloquia etc. to gain insight into current scientific discourse in Cognitive Science.
Thesis proposal: Students write a research proposal based on a thorough study of the relevant literature. The proposal contains a research plan in which (1) the theoretical relevance of the topic is substantiated, and the research questions and hypotheses are clearly formulated, (2) the planned methods and procedures are described, and (3) a time schedule for conducting the Master thesis in the fourth semester is proposed.

Teaching Methods

Practical learning during internship(s). Participation in scientific discourse during research talks. Regular individual meetings. Writing the proposal is mentored by the thesis supervisor.

Assessment

Proposal for the Master thesis

Assessment Prerequisites

Completion of internship(s) and research talks. Regular attendance in colloquia (66%, can be subject to department-specific variations).

Role of the Module (in other study degrees)

Contribution to the Overall Grade

The grade of the module assessment contributes weighted by the CP of the module.

Responsible Person

Krauß

Further Information

Field: Research

Nr.: MT	Credits	Workload	Semester	Frequency	Duration
	30 CP	900 h	4. Sem.	SS	1 Semester
Course Type			**Contact Hours**	**Self Study**	**Group Size**
Master Thesis			Individual consultation	900 h	-

Module: Master Thesis

Learning Outcomes

Course Competences: Students demonstrate their ability to undertake independent theoretical and/or empirical research, under supervision.

Social Competences: Working under supervision; in some fields working with experimental subjects.

Methodological Competences: The Master thesis is a demonstration of the student's ability to address a significant research question, to critically analyze theories and relevant literature, to conduct independent empirical investigation and to present the findings in an academic form.

Individual Competences: Students are capable of either writing a high-level theoretical thesis or they are capable of conducting an experiment and demonstrate proficiency in designing a new experiment, planning, data collection, analysis and interpretation, and finally reporting the research results in the format of a Master thesis or journal article.

Content

The main purpose of the Master thesis is to demonstrate that the student can undertake independent research, under supervision. Since the M.Sc. Cognitive Science is a research degree, the thesis must have a substantial research component, and it must be written in English. The thesis should also be of such quality and scope that excerpts of it warrant publication in the form of a peer-reviewed scientific journal paper (or constitutes a part of such a paper). This implies that the thesis must be an original contribution that is well-organized and expressed in clear English language. Completing a Master thesis prepares students for a PhD or other research opportunities.

Teaching Methods

Independent work on a scientific problem. Regular supervision including e.g. presentation of provisional results in a colloquium. The process of writing the Master thesis is mentored by one or two senior staff members with ample international expertise on the topic of choice.

Assessment

Written Master thesis

Assessment Prerequisites

The Master thesis must fulfill the usual standards of a research-oriented Master program. It will be reviewed and evaluated by the thesis supervisor and a second referee. The thesis must be completed according to the examination rules. The Master thesis in this research-oriented Master program is reviewed and evaluated according to generally acknowledged scientific criteria and expects a high level of originality. Furthermore, the usual criteria depend on the kind of project, e.g. (a) clarity of presentation, (b) original theoretical contributions, (c) adequacy of the empirical study according to design and analyses, (d) novelty of the data, (e) quality of the discussion and interpretation of the results.

Role of the Module (in other study degrees)

Contribution to the Overall Grade

The grade of the module assessment contributes weighted by the CP of the module.

Responsible Person

Krauß

Further Information