

JUSTUS-LIEBIG-



UNIVERSITÄT  
GIESSEN

Der Präsident

**Mitteilungen der  
Justus-Liebig-Universität Gießen**

Ausgabe vom  
**05.05.2023**

**7.36.06 Nr.5**

Special Regulation for the Master's program  
„Mind, Brain, and Behavior“

**Special Regulation for the Master's program  
„Mind, Brain, and Behavior“  
of the Faculty 06 – Psychology and Sports Science –  
of the Justus Liebig University Giessen**

**04.11.2020**

	Resolution FBR	Senate	Approval President's Office	Entry into force
1st version	04.11.2020	16.12.2020	19.01.2021	04.02.2021
2nd version	17.01.2023	22.03.2023	04.04.2023	05.05.2023

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

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### § 1 (zu § 2 Abs. 1)

- (1) The Master's program Mind, Brain, and Behavior results in a professional qualification and spans 4 semesters.
- (2) The program can only be started in the winter semester.

### § 2 (zu § 3)

After completion of the study program, the Faculty 06 – Psychology and Sports Science of the Justus Liebig University Giessen awards the degree of „Master of Science: Mind, Brain, and Behavior“.

### § 3 (zu § 5 Abs. 1)

(1) Admission to the Master's program Mind, Brain, and Behavior is only possible for those who can prove that they have completed a relevant course of study with a standard period of at least 6 semesters (180 CP in total), which was successfully completed with a Bachelor of Science (B.Sc.) in one of the following areas:

1. Movement Science
2. Biology
3. Computer Science/Data Science
4. Cognitive Science
5. Linguistics

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6. Neuroscience
7. Physics
8. Psychology
9. Behavioral Science

Other Bachelor's degrees may be accepted if the application documents show that the prerequisites for the Master's program Mind, Brain, and Behavior have been met.

(2) For admission to the Master's program, the following two-stage selection procedure must be successfully completed.

The selection procedure is supervised by the examination board of the master's programme Mind, Brain and Behavior.

1. Stage 1: First, applicants must meet specific criteria to be invited to a selection interview:

- Proof of English proficiency at level B2 of the Council of Europe's Common European Framework of Reference for Languages in one of the following ways: school diploma (proof of English as a foreign language over at least 6 years until graduating with a diploma that constitutes access to a university); TOEFL test (internet-based, 0-120 pts): 72 pts minimum; TOEFL test (computer-based, 0-300 pts) 227 pts minimum; TOEFL test (paper-based, 310-677 pts) 567 pts minimum; TOEIC test (10-990 pts): 785 pts minimum; IELTS test: grade 5 minimum; ESOL test: First Certificate in English (FCE); high school diploma that constitutes access to a university from the following countries: Australia, Ireland, Canada, New Zealand, USA, United Kingdom, South Africa; a bachelor's degree from the following countries: Australia, Ireland, Canada, New Zealand, USA, United Kingdom, South Africa.
- Achieve a minimum of 3 qualification points as a result of the average Bachelor's grade points (grade 0.7-1.9 or 15.0-11.3 grade points: 3 qualification points; grade 2.0-2.5 or 11.2-9.5 grade points: 2 qualification points) and additional qualifications (max. 1 qualification point: practical experience in the field of neuroscience or behavioral science (training or job certificate), or internship in the field of neuroscience or behavioral science (minimum of 8 weeks; only if done in addition the completed course of study), or completion of a specialized or advanced module with a focus on behavioral science or neuroscience (minimum of 9 credit points according to ECTS)).

The examination board appoints a person affiliated with the department to review the criteria in Stage 1 of the selection process.

2. Stage 2: All applicants meeting the above criteria will be invited to a selection interview in which they will be interviewed about their motivation, relevant previous knowledge and their Bachelor's thesis. In the selection interview, the applicants can obtain 0-15 points:

- Maximum of 3 points for motivation (criteria: Demonstrable interest in the Master's program „Mind, Brain, and Behavior“),
- maximum of 3 points for previous knowledge and skills (criteria: Experience and knowledge about behavioral sciences and cognitive neuroscience; experience with empirical and experimental methods),
- maximum of 9 points for the presentation of their bachelor thesis (criteria: Clarity and rigor of the presentation, discussion with respect to the current state of research, identification of open questions and possible future directions, answers to questions about the thesis).

Students scoring above 12 points are admitted to the program. The examination board appoints at least two members of the faculty (selection committee; of which at least one is a professor) to conduct the selection interviews in stage 2 of the selection procedure.

(3) Minutes will be taken of the selection interview.

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(4) The selection committee decides about admission to the Master's program as well as about exceptions to paragraph 1.

#### **§ 4 (zu § 8)**

The modules are described in Supplement 2. The language of instruction is English as a rule.

#### **§ 5 (zu § 7 Abs. 1)**

The Master's program Mind, Brain, and Behavior consists of 13 modules:

- 2 Core modules
- 4 Theory modules
- 4 Application modules
- 2 Elective modules
- 1 Master thesis module

#### **§ 6 (zu § 17 Abs. 3)**

For all modules, attendance as a prerequisite for examination is defined as follows: Absences of up to 3 hours or up to 2 sessions (for courses with 2 SWS) are possible. Other attendance regulations will be announced in the first meeting of a course. The above does not apply to lectures.

#### **§ 7 (zu § 8 Abs. 3)**

(1) Prerequisite for admission to the master thesis module (MBB-MA-TM) is proof of registration to 1 Core module, 4 Theory modules and 3 Application modules.

(2) As a rule, registration for the Master's thesis module is possible only after the end of the lecture period of the 3rd semester (according to the study plan). The examination board may decide on exceptions.

#### **§ 8 (zu § 10)**

Students must participate in a practical training. Further details are given in the practical training regulations (Supplement 4). Students or professors together with non-university employers can suggest practical training sites.

#### **§ 9 (zu § 18 Abs. 2 und Abs. 7)**

Types of examination are oral exams, written exams, essays, oral presentations (presentation of the key aspects of a specific topic in a concise, clear and comprehensible way, including presentation design and visualization), group work (preparation of a specific topic, including identification of relevant questions) and individual or group project work (working on one or several specific questions (e.g. programming tasks, design of a VR experiment, training and testing mathematical models, collection and analysis of imaging data, or collection and analysis of behavioral data) with the given means, e.g. with a specific programming language). The respective type of examination is specified in the module descriptions (Supplement 2).

#### **§ 10 (zu § 7 Abs. 3)**

A course of study is attached in Supplement 1.

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### **§ 11 (zu § 18 Abs. 3)**

(1) When registering for a module, students automatically register for the respective examinations. Withdrawal from examinations is only possible until the end of the fourth week of the lecture period. Only for lectures, withdrawal is possible until two weeks before the examination.

(2) Withdrawal is not possible from examination in the thesis module. Still, it is possible to withdraw for valid reasons as defined in § 29AllB.

### **§ 12 (zu § 24 Abs. 1)**

The duration of an oral exam is at least 20 minutes, but no more than 40 minutes, per examinee and course.

### **§ 13 (zu § 23 Abs. 2)**

The duration of a written exam is at least 90, but no more than 120 minutes

### **§ 14 (zu § 21)**

(1) The final paper (Master's thesis) is written in English. Oral examinations are in English.

(2) The work period for the Master's thesis is 150 days. The topic must be chosen so that it can be handled within this period.

### **§ 15 (zu § 20)**

(1) The study program has been passed if all compulsory modules of the program have been passed.

(2) The overall grade (rounded up to one decimal place) is calculated by dividing the sum of the weighted module grades (multiplication of each grade points with the module's CP) by the total number of CPs of the graded modules of the study program.

(3) A maximum of one module (a maximum of 8 CP) from the theory and application modules can be removed from the calculation of the overall grade at the student's discretion.

(4) The core modules Practical Training (13 CP) and Research Practice (9 CP) are evaluated as pass or fail and not graded. The corresponding CPs are not considered in the overall grade calculation.

### **§ 16 (zu §33 Abs. 1)**

After each examination, the examinee will be granted access to the files upon request. The request must be submitted to the lecturer within six weeks after the grade has been submitted to the examination administration system.

### **§ 17 Coming into effect and interim regulations**

This regulation comes into effect after its proclamation and will apply from the winter semester 2022/23.

## **Supplements**

Supplement 1 — Course of study

Supplement 2 — Modul descriptions

Supplement 3 — Elective modules

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#### Supplement 4 — Practical training regulations

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## Course of study

1. Semester	2. Semester	3. Semester	4. Semester
Visual Perception of Color and Materials (Theory module) <b>MBB-MA-THM-1</b> 6 CP	Application module II <b>MBB-MA-AM</b> 4 CP	Practical Training (Core module) <b>MBB-MA-KM-1</b> 13 CP External	Master Thesis Module (Thesis module) <b>MBB-MA-TM</b> 30 CP
Perception and Action (Theory module) <b>MBB-MA-THM-2</b> 3 CP	Perception and Action (Theory module) <b>MBB-MA-THM-2</b> 3 CP	Application module IV <b>MBB-MA-AM</b> 8 CP	
Application Module II <b>MBB-MA-AM</b> 4 CP	Application Module III <b>MBB-MA-AM</b> 8 CP		
Visual Cognition and Object Perception (Theory module) <b>MBB-MA-THM-3</b> 6 CP		Research Practice (Core module) <b>MBB-MA-KM-2</b> 9 CP	
Current Topics in Cognition and Development (Theory module) <b>MBB-MA-THM-4</b> 3 CP	Current Topics in Cognition and Development (Theory module) <b>MBB-MA-THM-4</b> 3 CP		
Application module I <b>MBB-MA-AM</b> 4 CP	Application module I <b>MBB-MA-AM</b> 4 CP		
Elective Module I (Elective module) <b>MBB-MA-REF-1</b> 6 CP External	Elective Module II (Elective module) <b>MBB-MA-REF-2</b> 6 CP External		
<b>32 CP</b>	<b>28 CP</b>	<b>30 CP</b>	
			<b>120 CP</b>

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### Overview of modules in M.Sc. Mind, Brain and Behavior

<b>Modulnummer</b>	<b>Modulbezeichnung</b>	<b>Modulart</b>
MBB-MA-KM-1	Practical Training	Core module (13 CP)
MBB-MA-KM-2	Research Practice	Core module (9 CP)
MBB-MA-THM-1	Visual Perception of Color and Materials	Theory module (6 CP)
MBB-MA-THM-2	Perception and Action	Theory module (6 CP)
MBB-MA-THM-3	Visual Cognition and Object Perception	Theory module (6 CP)
MBB-MA-THM-4	Current Topics in Cognition and Development	Theory module (6 CP)
MBB-MA-AM-1	Programming	Application module (8 CP)
MBB-MA-AM-2	Capturing and Emulating the World	Application module (8 CP)
MBB-MA-AM-3	Computational Modelling	Application module (8 CP)
MBB-MA-AM-4	Imaging and Recording Brain Activity	Application module (8 CP)
MBB-MA-AM-5	Measuring Human Behavior	Application module (8 CP)
MBB-MA-REF-1	Elective Module 1	Elective module (6 CP)
MBB-MA-REF-2	Elective Module 2	Elective module (6 CP)
MBB-MA-TM	Master Thesis Module	Thesis module (30 CP)

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MBB-MA-KM-1	Practical Training		13 CP
Core module	FB 06 / Psychologie / Studiendekanat		3. semester
	first offered in WS 2023/24		
<b>Learning Outcomes:</b> The students <ul style="list-style-type: none"> <li>familiarize with professional activities in fields related to Behavioral Science and Cognitive Neuroscience</li> <li>gain experience and practical training in fields related to Behavioral Science and Cognitive Neuroscience</li> <li>combine their acquired skills with practical on-the-job training</li> <li>receive an orientation for their personal career planning</li> </ul>			
<b>Content:</b> Practical training in selected professional fields related to Mind, Brain, and Behavior			
<b>Frequency and Duration:</b> annually			
<b>Module Coordinator:</b> Studiendekanat			
<b>Applies to the Study Programs:</b> M.Sc. Mind, Brain, and Behavior			
<b>Prerequisites for Participation:</b> None			
<b>Forms of Instruction:</b>	Contact hours	Preparation, exercises and follow-up work	
Practical training	360	30	
Total:	390		
<b>Prerequisites for Examination:</b> None			
<b>Module final examination:</b> <ul style="list-style-type: none"> <li>Term paper (5 pages)</li> <li>The module is not graded but evaluated with passed/failed</li> </ul>			
<b>Language of instruction and examination:</b> English			
<b>Notes:</b> Module information and literature: see semester notice / Dates: see course catalog.			

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MBB-MA-KM-2	Research Practice		9 CP
Core module	FB 06 / Psychologie / Studiendekanat		3. Semester
	first offered in WS 2023/24		
<b>Learning Outcomes:</b> The students <ul style="list-style-type: none"> <li>gain practical experience in empirical data collection and scientific work in the context of ongoing research projects in the departments</li> <li>gain knowledge and skills about the steps involved in experimental science</li> <li>learn to apply a particular set of methodical procedures</li> <li>learn to evaluate and document recorded data</li> <li>learn to present, interpret and discuss scientific findings</li> <li>are able to choose a topic for the Master thesis</li> </ul>			
<b>Content:</b> Research projects in the field of <ul style="list-style-type: none"> <li>Experimental psychology (Prof. für Allgemeine Psychologie, Kurt-Koffka-Professur für Experimentelle Psychologie)</li> <li>Perception and action (Prof. für Allgemeine Psychologie und Wahrnehmung und Handlung)</li> <li>Visual Neuroscience (Prof. für Allgemeine Psychologie und Visuelle Neurowissenschaften)</li> <li>Developmental Psychology (Prof. für Entwicklungspsychologie)</li> <li>other related topics (e.g., movement sciences, computer science)</li> </ul>			
<b>Frequency and Duration:</b> annually, 2 Semester, Seminar 1 WS or SS, Seminar 2 WS or SS			
<b>Module Coordinator:</b> Studiendekanat			
<b>Applies to the Study Programs:</b> M.Sc. Mind, Brain, and Behavior			
<b>Prerequisites for Participation:</b> None			
<b>Forms of Instruction</b>	Contact hours	Preparation, exercises and follow-up work	Project
Seminar	30	60	0
Project	0	0	180
Total:	270		
<b>Prerequisites for Examination:</b> Participation in 1 research project of a department (conception, planning, implementation)			

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**Module final examination:**

- Term paper (5 pages) or presentation (20-40 minutes) about 1 research project at the teacher's discretion, will be determined at the beginning of the course
- The module is not graded but evaluated with passed/failed

**Language of instruction and examination:** English

**Notes:** Module information and literature: see semester notice / Dates: see course catalogue

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MBB-MA-THM-1	Visual Perception of Color and Materials		6 CP
Theory module	FB 06 / Psychologie / Abt. Allgemeine Psychologie		1. Semester
	first offered in WS 2022/23		
<b>Learning Outcomes:</b> The students <ul style="list-style-type: none"> <li>• deepen their knowledge about human perception</li> <li>• gain fundamental knowledge about research questions and topics in color- and material perception</li> <li>• gain an overview of techniques used to measure and study color- and material perception</li> <li>• will be able to critically discuss past and current research on color- and material perception</li> </ul>			
<b>Content:</b> <ul style="list-style-type: none"> <li>• fundamentals in color and material perception</li> <li>• various techniques (e.g. psychophysics, neuroimaging, modelling, machine learning) to study color and material perception</li> <li>• recent developments in the fields of color and material perception</li> </ul>			
<b>Frequency and Duration:</b> annually, S1 WS or SS, S2 WS or SS			
<b>Module Coordinator:</b> Prof. für Allgemeine Psychologie / Prof. für Allgemeine Psychologie und Visuelle Neurowissenschaften			
<b>Applies to the Study Programs:</b> M.Sc. Mind, Brain, and Behavior			
<b>Prerequisites for Participation:</b> None			
<b>Forms of Instruction:</b>	Contact hours	Preparation, exercises and follow-up work	
Seminar S1 – Color science: theory and practice	30	60	
Seminar S2 – Material perception	30	60	
Total:	180		
<b>Prerequisites for Examination:</b> <ul style="list-style-type: none"> <li>• Regular attendance and a combination of a maximum of 2 of the following examination types, to be determined by the teacher at the beginning of each seminar: presentation (20-40 minutes), group work (30-40 minutes), term paper (5 pages)</li> </ul>			
<b>Module final examination:</b>			

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<ul style="list-style-type: none"> <li>• Written exam (90-120 minutes), oral exam (20-40 minutes), or term paper (10-16 pages)</li> </ul>
<p><b>Language of instruction and examination:</b> English</p>
<p><b>Notes:</b> Module information and literature: see semester notice / Dates: see course catalogue. Capacity of this module is 30 students. If demands exceed this capacity, the decision will be made by drawing lots.</p>

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MBB-MA-THM-2	Perception and Action	6 CP
Theory module	FB 06 / Psychologie / Abt. Allgemeine Psychologie und Abt. Entwicklungspsychologie	1. Semester
	first offered in WS 2022/23	
<p><b>Learning Outcomes:</b> The students</p> <ul style="list-style-type: none"> <li>• gain knowledge on the theoretical basis of the interplay of perception and action</li> <li>• understand space perception for action</li> <li>• acquire knowledge about typical experimental paradigms and methods to study the interplay of perception and action</li> <li>• study the characteristics of different goal-directed movements and their application in psychological research</li> <li>• gain knowledge about theories and current debates on the development of perception and action</li> <li>• acquire knowledge about experimental designs and methods of infant research</li> <li>• gain knowledge about theories on action planning</li> <li>• study the role of motor development in children' object perception</li> <li>• acquire knowledge about theories on perception-action coupling in children with motor impairments</li> </ul>		
<p><b>Content:</b></p> <ul style="list-style-type: none"> <li>• models of perception and action</li> <li>• prediction in perception and action</li> <li>• spatial reference frames</li> <li>• eye movements</li> <li>• reaching and grasping in infants and adults</li> <li>• acting in real and virtual environments</li> <li>• predictive abilities in early childhood</li> <li>• visual-spatial abilities during infancy</li> <li>• changes in action planning during childhood</li> <li>• motor development</li> </ul>		
<p><b>Frequency and Duration:</b> annually, S1 WS or SS, S2 WS or SS</p>		
<p><b>Module Coordinator:</b> Prof. für Allgemeine Psychologie mdS Wahrnehmung und Handlung / Prof. für Entwicklungspsychologie</p>		
<p><b>Applies to the Study Programs:</b> M.Sc. Mind, Brain, and Behavior</p>		
<p><b>Prerequisites for Participation:</b> None</p>		

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<b>Forms of Instruction:</b>	Contact hours	Preparation, exercises and follow-up work
Seminar S1 – Space perception and action	30	60
Seminar S2 – Development of perception and action	30	60
Total:	180	
<b>Prerequisites for Examination:</b>		
<ul style="list-style-type: none"> <li>Regular attendance and a combination of a maximum of 2 of the following examination types, to be determined by the teacher at the beginning of each seminar: presentation (20-40 minutes), term paper (5 pages)</li> </ul>		
<b>Module final examination:</b>		
<ul style="list-style-type: none"> <li>Written exam (90-120 minutes), oral exam (20-40 minutes), or term paper (10-16 pages)</li> </ul>		
<b>Language of instruction and examination:</b> English		
<p><b>Notes:</b> Module information and literature: see semester notice / Dates: see course catalogue. Capacity of this module is 30 students. If demands exceed this capacity, the decision will be made by drawing lots.</p>		

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MBB-MA-THM-3	Visual Cognition and Object Perception	6 CP
Theory module	FB 06 / Psychologie / Abt. Allgemeine Psychologie	1. Semester
	first offered in WS 2022/23	
<p><b>Learning Outcomes:</b> The students</p> <ul style="list-style-type: none"> <li>• gain knowledge about the interplay between perceptual processes and cognition, with a focus on objects and their properties</li> <li>• learn how to dissect behavioral tasks to identify distinct computational challenges and their associated processes in the human perceptual and cognitive systems</li> <li>• understand the historical context of current controversies in object perception and cognition</li> <li>• gain knowledge about the primary methods used to probe attention, working memory and perceptual process associated with objects</li> <li>• understand how computational models can formalize psychological theories of object-related perceptual and cognitive processes</li> </ul>		
<p><b>Content:</b></p> <ul style="list-style-type: none"> <li>• pre-attentive perceptual processes involved in identifying and tracking objects and their properties</li> <li>• visual search, attentional selection and saliency</li> <li>• processing capacity limitations and their impact on human task performance</li> <li>• visual working memory: theory and experiments</li> <li>• objects as a psychological construct: historical and contemporary perspectives in infants and adults</li> <li>• theories and computational models of object recognition</li> <li>• grouping, occlusion and object permanence</li> <li>• implicit and explicit physical reasoning</li> <li>• numerosity, number sense and statistical representations</li> </ul>		
<b>Frequency and Duration:</b> annually, S1 WS or SS, S2 WS or SS		
<b>Module Coordinator:</b> Kurt-Koffka-Prof. für Experimentelle Psychologie		
<b>Applies to the Study Programs:</b> M.Sc. Mind, Brain, and Behavior		
<b>Prerequisites for Participation:</b> None		
<b>Forms of Instruction:</b>	Contact hours	Preparation, exercises and follow-up work

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Seminar S1 – Visual object perception	30	60
Seminar S2 – Visual cognition	30	60
Total:	180	
<p><b>Prerequisites for Examination:</b></p> <ul style="list-style-type: none"> <li>Regular attendance and a combination of a maximum of 2 of the following examination types, to be determined by the teacher at the beginning of each seminar: presentation (20-40 minutes), term paper (5 pages)</li> </ul>		
<p><b>Module final examination:</b></p> <ul style="list-style-type: none"> <li>Written exam (90-120 minutes), oral exam (20-40 minutes), or term paper (10-16 pages)</li> </ul>		
<p><b>Language of instruction and examination:</b> English</p>		
<p><b>Notes:</b> Module information and literature: see semester notice / Dates: see course catalog. Capacity of this module is 30 students. If demands exceed this capacity, the decision will be made by drawing lots.</p>		

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

MBB-MA-THM-4	Current Topics in Cognition and Development		6 CP
Theory module	FB 06 / Psychologie / Abt. Allgemeine Psychologie und Abt. Entwicklungspsychologie		1.-2. Semester
	first offered in WS 2022/23		
<p><b>Learning Outcomes:</b> The students</p> <ul style="list-style-type: none"> <li>gain insight into current research topics in experimental and developmental psychology (e.g., color and material perception, perception and action, development of face processing, motor cognition, music perception)</li> <li>deepen their knowledge about theories and current debates in perception, cognition and the development of perception, cognition and action</li> <li>deepen their knowledge about experimental paradigms and methods to study perception, cognition and the development of perception, cognition and action</li> </ul>			
<p><b>Content:</b></p> <ul style="list-style-type: none"> <li>recent developments in the fields of perception, cognition and developmental psychology</li> <li>different research topics from the fields of perception, cognition and developmental psychology with a focus on new findings and current debates (e.g., color and material perception, perception and action, development of face processing, motor cognition, music perception)</li> </ul>			
<b>Frequency and Duration:</b> annually, S1 WS or SS, S2 WS or SS			
<b>Module Coordinator:</b> Prof. für Allgemeine Psychologie / Prof. für Entwicklungspsychologie			
<b>Applies to the Study Programs:</b> M.Sc. Mind, Brain, and Behavior			
<b>Prerequisites for Participation:</b> None			
<b>Forms of Instruction:</b>	Contact hours	Preparation, exercises and follow-up work	
Colloquium 1 – Current topics in perception and cognition	30	60	
Colloquium 2 – Development of perception, cognition, and action	30	60	
Total:	180		
<p><b>Prerequisites for Examination:</b></p> <ul style="list-style-type: none"> <li>Regular attendance</li> </ul>			

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

**Module Examination:**

- No final examination, the module is not graded

**Language of instruction and examination:** English

**Notes:** Module information and literature: see semester notice / Dates: see course catalogue.  
Capacity of this module is 30 students. If demands exceed this capacity, the decision will be made by drawing lots.

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

MBB-MA-AM-1	Programming		8 CP
Application module	FB 06 / Psychologie / Abt. Allgemeine Psychologie		1.-2. Semester
	first offered in WS 2022/23		
<b>Learning Outcomes:</b> The students <ul style="list-style-type: none"> <li>• learn basic concepts of programming with Matlab</li> <li>• learn how to work with arrays and matrices</li> <li>• learn how to work with external data files and how to plot data</li> <li>• gain experience in how to use basics of logical operations, control-flow and debugging</li> <li>• learn to program psychological experiments</li> </ul>			
<b>Content:</b> <ul style="list-style-type: none"> <li>• basic concepts of programming</li> <li>• introduction to Matlab environment</li> <li>• introduction to basic functions in Matlab</li> <li>• transforming experimental designs into programming code</li> <li>• hands-on practice of the theoretical concepts (see above)</li> <li>• introduction to Matlab-Psychtoolbox</li> </ul>			
<b>Frequency and Duration:</b> annually, S1 WS or SS, S2 WS or SS			
<b>Module Coordinator:</b> Prof. für Allgemeine Psychologie mdS Wahrnehmung und Handlung			
<b>Applies to the Study Programs:</b> M.Sc. Mind, Brain, and Behavior			
<b>Prerequisites for Participation:</b> None			
<b>Forms of Instruction:</b>	Contact hours	Preparation, exercises and follow-up work	Project
Seminar S1 – Matlab I	30	60	30
Seminar S2 – Matlab II	30	60	30
Total:	240		
<b>Prerequisites for Examination:</b> <ul style="list-style-type: none"> <li>• Regular attendance and a combination of a maximum of 2 of the following examination types, to be determined by the teacher at the beginning of each seminar: presentation (20-40 minutes), term paper (5 pages)</li> </ul>			

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**Module final examination:**

- Written exam (90-120 minutes), term paper (10-16 pages), or individual/group project work (60 hours; e.g., solving programming tasks)

**Language of instruction and examination:** English

**Notes:** Module information and literature: see semester notice / Dates: see course catalogue. Capacity of this module is 30 students. If demands exceed this capacity, the decision will be made by drawing lots.

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MBB-MA-AM-2	Capturing and Emulating the World		8 CP
Application module	FB 06 / Psychologie / Abt. Allgemeine Psychologie		2.-3. Semester
	first offered in WS 2022/23		
<b>Learning Outcomes:</b> The students <ul style="list-style-type: none"> <li>• learn about recent advances in computer graphics (CG) and virtual reality (VR) research</li> <li>• understand how problems can be expressed in programming code</li> <li>• study how motion capture and VR are used as a tool in psychological research</li> <li>• acquire a working knowledge of CG software for stimulus generation</li> <li>• understand the core concepts of 3D modelling, lighting design, material editing, and rendering</li> <li>• learn to use stimuli and program a first VR experiment</li> </ul>			
<b>Content:</b> <ul style="list-style-type: none"> <li>• fundamental knowledge about CG and VR research in Psychology</li> <li>• basic programming</li> <li>• 3D modelling and stimulus generation</li> <li>• scene conceptualization in real and virtual worlds</li> <li>• real and virtual photography, videography and content editing workflows</li> <li>• design and creation of a first VR experiment</li> </ul>			
<b>Frequency and Duration:</b> annually, S1 WS or SS, S2 WS or SS			
<b>Module Coordinator:</b> Kurt-Koffka-Prof. für Experimentelle Psychologie / Prof. für Allgemeine Psychologie mdS Wahrnehmung und Handlung			
<b>Applies to the Study Programs:</b> M.Sc. Mind, Brain, and Behavior			
<b>Prerequisites for Participation:</b> None			
<b>Forms of Instruction:</b>	Contact hours	Preparation, exercises and follow-up work	Project
Seminar S1 – Computer graphics, CG	30	60	30
Seminar S2 – Virtual reality, VR	30	60	30
Total:	240		
<b>Prerequisites for Examination:</b>			

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<ul style="list-style-type: none"> <li>Regular attendance and a combination of a maximum of 2 of the following examination types, to be determined by the teacher at the beginning of each seminar: presentation (20-40 minutes), term paper (5 pages)</li> </ul>
<p><b>Module final examination:</b></p> <ul style="list-style-type: none"> <li>Written exam (90-120 minutes), term paper (10-16 pages), or individual/group project work (60 hours; e.g., designing a VR experiment).</li> </ul>
<p><b>Language of instruction and examination:</b> English</p>
<p><b>Notes:</b> Module information and literature: see semester notice / Dates: see course catalogue. Capacity of this module is 30 students. If demands exceed this capacity, the decision will be made by drawing lots.</p>

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MBB-MA-AM-3	Computational Modelling		8 CP
Application module	FB 06 / Psychologie / Abt. Allgemeine Psychologie		2.-3. Semester
	first offered in SS 2023		
<p><b>Learning Outcomes:</b> The students</p> <ul style="list-style-type: none"> <li>gain fundamental knowledge about how computational modelling provides insights into mind, brain and behavior</li> <li>gain practical experience in developing and testing computational models of behavioral data</li> <li>learn a variety of modelling approaches and their relative strengths and weakness</li> <li>learn to program computational models in software frameworks used by researchers</li> </ul>			
<p><b>Content:</b></p> <ul style="list-style-type: none"> <li>studies exemplifying different modelling approaches in the literature</li> <li>application of computational modelling methods to real data</li> <li>supervised and unsupervised machine learning methods</li> <li>Bayesian approaches</li> <li>deep neural networks: training and testing</li> <li>model and data visualization methods</li> </ul>			
<b>Frequency and Duration:</b> annually, S1 WS or SS, S2 WS or SS			
<b>Module Coordinator:</b> Kurt-Koffka-Prof. für Experimentelle Psychologie			
<b>Applies to the Study Programs:</b> M.Sc. Mind, Brain, and Behavior			
<b>Prerequisites for Participation:</b> For participation, students have to have completed AM-1 Programming or provide evidence of experience with Matlab programming (e.g., module(s) with at least 6 CP). Experience with the programming language Python is recommended.			
<b>Forms of Instruction:</b>	Contact hours	Preparation, exercises and follow-up work	Project
Seminar S1 – Introduction to computational modelling	30	60	30
Seminar S2 – Deep learning	30	60	30
Total:	240		
<b>Prerequisites for Examination:</b>			

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<ul style="list-style-type: none"> <li>Regular attendance and a combination of a maximum of 2 of the following examination types, to be determined by the teacher at the beginning of each seminar: presentation (20-40 minutes), term paper (5 pages)</li> </ul>
<p><b>Module final examination:</b></p> <ul style="list-style-type: none"> <li>Written exam (90-120 minutes), term paper (10-16 pages), or individual/group project work (60 hours; e.g., training and testing a mathematical model).</li> </ul>
<p><b>Language of instruction and examination:</b> English</p>
<p><b>Notes:</b> Module information and literature: see semester notice / Dates: see course catalogue. Capacity of this module is 30 students. If demands exceed this capacity, the decision will be made by drawing lots.</p>

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MBB-MA-AM-4	Imaging and Recording Brain Activity		8 CP
Application module	FB 06 / Psychologie / Abt. Allgemeine Psychologie		2.-3. Semester
	first offered in WS 2022/23		
<p><b>Learning Outcomes:</b> The students</p> <ul style="list-style-type: none"> <li>• know advantages and disadvantages of different neuroimaging methods</li> <li>• acquire knowledge about the theoretical basis of electrophysiological recordings (EEG) in humans</li> <li>• acquire knowledge about the theoretical basis of (functional) magnetic resonance imaging (fMRI)</li> <li>• learn how to design an fMRI experiment</li> <li>• learn how to record brain activity in the EEG lab</li> <li>• learn how to conduct brain scans using an MR scanner</li> <li>• acquire knowledge about different types of artefacts</li> <li>• learn how to analyze and interpret EEG and fMRI data</li> </ul>			
<p><b>Content:</b></p> <ul style="list-style-type: none"> <li>• foundations of electroencephalography and of fMRI</li> <li>• event-related potentials in perception, action and cognition</li> <li>• hands-on EEG recording &amp; fMRI data collection</li> <li>• data pre-processing (e.g. artefact reduction, data cleaning, data filtering)</li> <li>• statistical data analyses (e.g. ERP amplitude and latency, GLM, ROI analysis, MVPA)</li> <li>• plotting data and interpreting spatial maps</li> </ul>			
<b>Frequency and Duration:</b> annually, S1 WS or SS, S2 WS or SS			
<b>Module Coordinator:</b> Prof. für Allgemeine Psychologie mdS Wahrnehmung und Handlung / Prof. für Allgemeine Psychologie und Visuelle Neurowissenschaften			
<b>Applies to the Study Programs:</b> M.Sc. Mind, Brain, and Behavior			
<b>Prerequisites for Participation:</b> None			
<b>Forms of Instruction:</b>	Contact hours	Preparation, exercises and follow-up work	Project
Seminar S1 – Electroencephalography, EEG	30	60	30
Seminar S2 – Functional magnetic resonance imaging, fMRI	30	60	30

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

Total:	240
<b>Prerequisites for Examination:</b>	
<ul style="list-style-type: none"> <li>Regular attendance and a combination of a maximum of 2 of the following examination types, to be determined by the teacher at the beginning of each seminar: presentation (20-40 minutes), term paper (5 pages)</li> </ul>	
<b>Module final examination:</b>	
<ul style="list-style-type: none"> <li>Written exam (90-120 minutes), term paper (10-16 pages), or individual/group project work (60 hours; e.g., collecting and analyzing imaging data)</li> </ul>	
<b>Language of instruction and examination:</b> English	
<p><b>Notes:</b> Module information and literature: see semester notice / Dates: see course catalog. Capacity of this module is 30 students. If demands exceed this capacity, the decision will be made by drawing lots.</p>	

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MBB-MA-AM-5	Measuring Human Behavior		8 CP
Application module	FB 06 / Psychologie / Abt. Allgemeine Psychologie		2.-3. Semester
	first offered in SS 2023		
<p><b>Learning Outcomes:</b> The students</p> <ul style="list-style-type: none"> <li>familiarize with different eye and body movement tracking techniques</li> <li>learn how to use tracking equipment and record eye and body movements</li> <li>use relevant programs to analyze and visualize eye and body movement data and interpret the results</li> <li>understand the value of eye and body movement data for human performance, perceptual functions, pathological situations, as well as associated practical implications</li> </ul>			
<p><b>Content:</b></p> <ul style="list-style-type: none"> <li>basic concepts of movement tracking</li> <li>introduction to basic principles of kinematics</li> <li>implications of eye and body movement tracking and analysis for human performance, perception and pathology (e.g., training, rehabilitation, video games)</li> <li>introduction to eye and body movement tracking systems (e.g., Optotrak)</li> <li>hands-on practice of the theoretical concepts (see above)</li> <li>design and implementation of eye and body movement tracking experiments (e.g., reaching/grasping, standing, walking...)</li> <li>analysis and visualization of collected data by using relevant analysis programs</li> </ul>			
<b>Frequency and Duration:</b> annually, S1 WS or SS, S2 WS or SS			
<b>Module Coordinator:</b> Prof. für Allgemeine Psychologie mdS Wahrnehmung und Handlung / Prof. für Allgemeine Psychologie			
<b>Applies to the Study Programs:</b> M.Sc. Mind, Brain, and Behavior			
<b>Prerequisites for Participation:</b> For participation, students have to have completed AM-1 Programming or provide evidence of experience with Matlab programming (e.g., module(s) with at least 6 CP).			
<b>Forms of Instruction:</b>	Contact hours	Preparation, exercises and follow-up work	Project
Seminar S1 – Body movement analysis	30	60	30
Seminar S2 – Eye movements	30	60	30

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Total:	240
<b>Prerequisites for Examination:</b>	
<ul style="list-style-type: none"> <li>• Regular attendance and a combination of a maximum of 2 of the following examination types, to be determined by the teacher at the beginning of each seminar: presentation (20-40 minutes), term paper (5 pages)</li> </ul>	
<b>Module final examination:</b>	
<ul style="list-style-type: none"> <li>• Written exam (90-120 minutes), term paper (10-16 pages), or individual/group project work (60 hours; e.g., collecting and analyzing behavioral data).</li> </ul>	
<b>Language of instruction and examination:</b> English	
<p><b>Notes:</b> Module information and literature: see semester notice / Dates: see course catalogue. Capacity of this module is 30 students. If demands exceed this capacity, the decision will be made by drawing lots.</p>	

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MBB-MA-TM	Master Thesis Module		30 CP
Thesis Module	FB 06 / Psychologie / Alle Abteilungen		4. Semester
	first offered in WS 2023/24		
<b>Learning Outcomes:</b> The students <ul style="list-style-type: none"> <li>gain profound knowledge about empirical data collection and scientific work</li> <li>learn scientific argumentation</li> <li>learn to reflect the contents of the Master program</li> <li>learn to conduct, analyze and write down a research project</li> </ul>			
<b>Content:</b> <ul style="list-style-type: none"> <li>Work independently on a research project</li> <li>Collect and analyze empirical data within a time of 150 days</li> <li>Complete a written thesis on the research project</li> </ul>			
<b>Frequency and Duration:</b> annually			
<b>Module Coordinator:</b> Alle departments			
<b>Applies to the Study Programs:</b> M.Sc. Mind, Brain, and Behavior			
<b>Prerequisites for Participation:</b> Registration to 1 core module, 4 theory modules, and 3 application modules			
<b>Forms of Instruction:</b>	Contact hours	Preparation, exercises and follow-up work	
Master thesis	100	800	
Total:	900		
<b>Prerequisites for Examination:</b> none			
<b>Module final examination:</b> <ul style="list-style-type: none"> <li>Complete and submit the master thesis in due time (50-80 pages)</li> </ul>			
<b>Language of instruction and examination:</b> English			
<b>Notes:</b> Module information and literature: see semester notice / Dates: see course catalogue			

Special Regulation for Master's Study Program in Faculty 06 Joint Attachment 3: Elective Modules „Mind, Brain and Behavior“	##.##.2023	<b>7.36.06 Nr. 5</b>	S. 1
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## List of elective modules

Code	Name
<b>BSc Economics and Business Studies<sup>1</sup></b>	
02-BWL:BSc-B1-1	Marketing
02-BWL:BSc-B1-3	Customer Management
02-BWL:BSc-B1-4	Sales Strategy and Execution
02-BWL:BSc-B10-2	Technology and Innovation Management
<b>MSc Economics<sup>2</sup></b>	
02-BWL:MSc-B1-1	Product Management
02-BWL:MSc-B10-1	Managing the Innovation Process
02-BWL:MSc-B10-2	Creativity and Entrepreneurship
02-BWL-MSc-B11-1	Text Mining
<b>BSc Data Science<sup>3</sup></b>	
07-BDS-18	Scientific Programming and Data Analysis
<b>MSc Data Science<sup>4</sup></b>	
07-MDS-01	Quantitative Foundations of Artificial Intelligence
<b>MSc Psychology<sup>5</sup></b>	
PSY-MA-WPM-3	Cognitive Neuroscience
<b>MSc Human Movement Analytics: Biomechanics, Motor Control and Learning<sup>6</sup></b>	
06-MA-HMA-01	Applied Mathematics
06-MA-HMA-02	Biomechanics I
06-MA-HMA-03	Computational Principles of Motor Control
06-MA-HMA-06	Specific Data Analysis
06-MA-HMA-08	Cognitive Neuroscience of Action

<sup>1</sup> Module descriptions can be found in Supplement 2 (Anlage 2) of the regulations of the B.Sc. program „Economics and Business studies“ (Faculty 02) ([MUG 7.35.02 Nr. 2](#)).

<sup>2</sup> Module descriptions can be found in Supplement 2 (Anlage 2) of the regulations of the M.Sc. program „Economics“ (Faculty 02) ([MUG 7.36.02 Nr. 2](#)).

<sup>3</sup> Module descriptions can be found in Supplement 2 (Anlage 2) of the regulations of the B.Sc. program „Data Science“ (Faculty 07) ([MUG 7.35.07 Nr. 6](#)).

<sup>4</sup> Module descriptions can be found in Supplement 2 (Anlage 2) of the regulations of the M.Sc. program „Data Science“ (Faculty 07) ([MUG 7.36.07 Nr. 2](#)).

<sup>5</sup> Module descriptions can be found in Supplement 2 (Anlage 2) of the regulations of the M.Sc. program „Psychology“ (Faculty 06) ([MUG 7.36.06 Nr. 3](#)).

<sup>6</sup> Module descriptions can be found in Supplement 2 (Anlage 2) of the regulations of the M.Sc. program „Human Movement Analytics: Biomechanics, Motor Control and Learning“ (Faculty 06) ([MUG 7.36.06 Nr. 1](#)).

In addition to the elective modules described above, it is possible to attend other 6 CP courses from any other study program. However, this requires consultation of the respective lecturers.

Special Regulation for Master's Study Program in Faculty 06 Joint Attachment 4: Practical Training Regulations „Mind, Brain and Behavior“	##.##.2023	7.36.06 Nr. 5	S. 1
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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

**Regulations for the practical training  
in the Master's program „Mind, Brain, and Behavior“  
of the Faculty Psychology and Sports Science  
of the Justus Liebig University Giessen**

**Contents**

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 § 2 Carrying out the practical training ..... 1  
 § 3 Verification, approval and evaluation ..... 2

**§ 1 Aim and content**

(1) These regulations cover the practical training module in the Master's degree program Mind, Brain, and Behavior.

(2) The students should acquire practical knowledge and skills in companies and other institutions that perform work related to the study program. The practical training should increase applied knowledge of research in the Behavioral Sciences or Cognitive Neurosciences.

(3) Economic, technical, organizational and social aspects of work should increase the understanding of research in the study program as well as promote the link between study and practice. In particular, students should become familiar with practical job contexts, leadership and management. Practical training abroad, which is in line with the objectives and contents above, is supported and can be approved in accordance with § 3.

**§ 2 Carrying out the practical training**

(1) The practical training is part of the core module "Practical Training" and comprises 360 hours.

(2) Practical training can be completed in all companies and other institutions conducting applied research related to the following topics: Movement Science, Biology, Data Science/Computer Science, Cognitive Science, Linguistics, Neuroscience, Physics, Psychology, or Behavioral Science. As a rule, activities are approved in

1. technology companies; e.g., from the fields of autonomous driving, data science, development of software and hardware, ergonomics, internet services, artificial intelligence/machine learning, medical technology, human-machine interaction, robotics, or virtual reality
2. product or industrial design companies
3. market research institutes
4. management consultancies
5. art, science, or technology museums related to the study program
6. universities and other research institutions
7. Other companies or institutions can be approved if the relevance of the work can be confirmed via graduate surveys, generally available career information, or other appropriate sources. The practical training site must be approved by the module supervisor prior to starting the training.

Relevant previous practical or professional training and internships can be approved in exceptional cases upon application.

(3) Before starting the practical training, students can seek advice about recommended activities from the person responsible for the module.

Spezielle Ordnung für den Master-Studiengang „Mind, Brain, and Behavior“ Anlage 4: Praktikumsordnung	XX.XX.2023	<b>7.36.06 Nr. 5</b>	S. 2
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### **§ 3 Verification, approval and evaluation**

- (1) For the approval of the practical training, the student submits an original certificate from the practical training site to the person responsible for the module, including verification about the duration and content of the practical training. In addition, the student submits an internship summary report to the internship database of the department.
- (2) On the basis of the submitted documents and activities, the chairperson carries out the approval and evaluation (pass/fail) of the module.
- (3) If the submission is deemed to be insufficient, the person responsible for the module may decide about additional requirements.