Degree Program and Examination Regulations for the Master's Degree Program M. Sc. Cognitive Neuroscience within the Department of Education and Psychology at Freie Universität Berlin

Disclaimer: *Please note that only the German versions of these documents are legally binding. This translation is intended for the convenience of the non-German-reading public and is for information purposes only.*

Preamble

On the basis of Section 14.1.1.2 of Freie Universität Berlin's supplemental rules and regulations [*Teilgrundordnung (Erprobungsmodell)*] from October 1998, published in FU-Mitteilungen No. 24/1998 (the official bulletin of Freie Universität Berlin), the Department Council (*Fachbereichsrat*) of the Department of Education and Psychology at Freie Universität Berlin issued the following degree program and examination regulations for the master's degree program M. Sc. Cognitive Neuroscience within the Department of Education and Psychology on February 16, 2023:*

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§ 1
Scope

(1) These regulations define the objectives, content, and structure of the master's degree program M. Sc. Cognitive Neuroscience within the Department of Education and Psychology at Freie Universität Berlin. These regulations apply in conjunction with Freie Universität Berlin's framework regulations for degree programs and examinations as they outline the requirements and processes necessary to complete coursework and assessments toward completion of a master's degree program.

(2) The degree program is a consecutive master's degree as defined by Section 23.3.1.1a of the Berlin Higher Education Act (BerlHG) from July 26, 2011 (GVBl. p. 378), last amended on September 28, 2020 (GVBl. p. 758). It is designed with a focus on research.

§ 2
Learning Objectives

(1) Graduates of the master's degree program are well-acquainted with the major theoretical and empirical findings of cognitive neuroscience, as well as their biological, cognitive, and psychological bases. They have wide-ranging skills in research methodology that help them to identify new issues and questions in the area of cognitive neuroscience, carry out analyses by means of neurocognitive measurement methods, and make observations with the aid of mathematical and computer-based models. They are able to work independently on issues from the discipline of cognitive neuroscience and evaluate different approaches and methods with regard to their advantages and disadvantages.

(2) Along with their subject-specific qualifications, graduates also have teamwork skills, communication skills, and transferable skills. They are equipped with the techniques they require to carry out scientific research, read and compose texts in English, and present their work. The students are familiar with the general principles of scientific work as well as good scientific practice and can take these into account when carrying out scientific activities. They are familiar with ideas concerning gender and diversity; and are able to factor gender and diversity-related perspectives, including viewpoints that differ from their own, into all aspects of their work.

(3) Graduates of the master's degree program are qualified to take on leading professional roles in a wide range of fields related to basic and applied research that employ methods from neurocognitive and behavioral science, such as healthcare, different industrial sectors, the internet and data economy, and academic research and teaching. Graduates of the master's degree program are also qualified to continue to doctoral study and thus gain additional academic qualifications.

§ 3
Curriculum Contents

(1) In order to achieve the relevant qualification goals, the master's degree program first addresses the general theoretical and empirical foundations of cognitive neuroscience. At the same time, it imparts methodological and data analysis skills, which then provide them with the basis they need to acquire specific skills to independently

* These regulations were confirmed by the Executive Board of Freie Universität Berlin on March 2, 2023.

apply neurocognitive procedures and analyze the resulting data.

(2) By providing students with an in-depth education and training in the applicable sub-areas of cognitive neuroscience, the master's degree program provides them with the skills they need to identify relevant cognitive psychological, behavioral, and neuroscientific issues, develop the appropriate empirical operationalizations, acquire and analyze the corresponding empirical data, and correctly interpret and present the results in an academic context. The degree program centers theoretical, methodical, and data analytical aspects as the foundations for independent scientific work. The principles of scientific work and good scientific practice are taught and applied. Over the course of study, students are introduced and guided in scientific work, whereby gender and diversity aspects are also taken into consideration.

(3) Students of the degree program become familiar with the content and working methods of research-oriented fields of study. Along with specialist skills in different areas of cognitive neuroscience, they acquire interdisciplinary skills and key qualifications that prepare them for research activities later on, including communicating scientific results as well as developing empirical questions and putting them into practice.

§ 4
General Academic and Departmental Advising

(1) The Center for Academic Advising and Psychological Counseling at Freie Universität Berlin provides general academic advising for students.

(2) Instructors who teach courses offered in the master's degree program provide departmental advising during their office hours. A student aid is also available to give additional advising support. Furthermore, students are advised to discuss the suitability of their individual curriculum plan with the Psychology Student Affairs Office at the Department of Education and Psychology.

(3) It is highly recommended that students who have yet to complete at least one third of the required credit points upon reaching the mid-way point of the standard time to degree completion for this degree program arrange an appointment for departmental advising to ensure that they are adequately supported in successfully continuing their studies..

§ 5
Examination Board

The examination board is appointed by the Department Council of the Department of Education and Psychology, Freie Universität Berlin. The board is responsible for organizing examinations and the other tasks stipulated by the framework regulations for degree programs and examinations (*Rahmenstudien- und -prüfungsordnung der Freien Universität Berlin*, RSPO).

§ 6
Standard Time to Degree

The standard time to degree is four semesters.

§ 7
Structure and Components; Distribution of Credit Points

(1) Students must complete modules totaling 90 credit points and a master's thesis with a corresponding colloquium and a presentation of their research totaling 30 credit points in order to complete the master's degree program.

(2) The master's degree program comprises required modules totaling 75 credit points and optional modules totaling 15 credit points.

1. The following required modules are to be completed:

   - Module: Cognitive Neuroscience: Perception, Attention, Action, and Cognitive Control (10 credit points)

   - Module: Cognitive Neuroscience: Memory, Emotion, Language, and Consciousness (10 credit points)

   - Module: Cognitive Neuroscience: Research Practice (10 credit points)

   - Module: Neurocognitive Methods and Data Analysis (10 credit points)

   - Module: Probabilistic and Statistical Modelling (10 credit points)

   - Module: Introduction to Programming (5 credit points)

   - Module: Neurocognitive Methods Practical (5 credit points)

   - Module: Research Workshop (5 credit points)

   - Module: Research Experience (10 credit points)

   Students are afforded the opportunity to select specific topics within the modules, especially the module "Research Experience" (10 credit points).

2. Modules in the scope of 15 credit points must be chosen and completed from the following optional modules:

   - Module: Applied MRI/fMRI: Data Modeling (5 credit points)

   - Module: Applied MRI/fMRI: Advanced Data Modeling (5 credit points)

   - Module: Applied EEG: Data Modeling (5 credit points)

   - Module: Applied EEG: Advanced Data Modeling (5 credit points)

   - Module: Applied Cognitive Neuroscientific Methods: Data Modeling (5 credit points)

   - Module: Applied Cognitive Neuroscientific Methods: Advanced Data Modeling (5 credit points)

- Module: Applied Cognitive Neuroscience (5 credit points)
- Module: Applied Theoretical Neuroscience (5 credit points)
- Module: Applied Computational Cognitive Neuroscience (5 credit points)

Upon request and following approval from the examination board, related modules from other master's degree programs worth up to 15 credit points may also be credited toward the elective area, provided that the student has access to the respective modules. It is recommended that students wishing to select modules from other master's degree programs first consult their student affairs office.

(3) The module descriptions for each module in Appendix 1 provide information on the prerequisites, the contents and learning objectives, the modes of instruction, the workload, the different types of active participation, the various assessments that students must take during the program, information on participation requirements in the different modes of instruction, the standard duration, and how often courses are offered. Please refer to the Degree Program and Examination Regulations for the Master's Degree Program in Data Science within the Department of Mathematics and Computer Science and the Department of Education and Psychology for further information on the module "Natural Language Processing" (10 credit points).

(4) Appendix 2 is a standard plan for completing the master's degree program.

§ 8
Modes of Instruction

(1) The following modes of instruction will be offered as part of the curriculum:

1. Lectures (V) convey knowledge of a specific subject area and its research questions. The main mode of instruction is a presentation prepared by the respective instructor. The participants may interact with the instructor and engage in joint discussions at the end of individual sections.
2. Advanced lectures (VV) provide in-depth knowledge about a specific subject area and its research problems. The main mode of instruction is a presentation prepared by the instructor. Participants have the opportunity to interact with the instructor and engage in discussions at the end of individual sections.
3. Seminars (S) systematically convey more in-depth knowledge on a selected subject area, question, or issue within psychology. The main modes of instruction and learning include seminar discussions and group work among the participants, with students conducting independent research before and after the seminar in order to practice independent scientific work.
4. Practice sessions (Ü) instill practical knowledge and skills in students as well as techniques related to a specific subject area. Students learn how to independently work on a task according to scientific criteria, present the results, and discuss the subject using critical thinking. The main mode of instruction and learning involves the practical application of subject-specific skills in working with data analysis software.
5. Practical seminars (PrS) provide an opportunity for students to apply educational content and the working methods of psychology as a scientific discipline in the context of a practical project. The main mode of instruction and learning is the supervised implementation of a practical project.
6. Teaching research projects (LFP) are designed for students to integrate their theoretical knowledge and methodological expertise so that they can gain experience in research. They develop the ability to independently conduct empirical experiments. The main mode of instruction is intensive collaboration between instructors and small study groups.
7. Colloquia (Co) facilitate the academic exchange of ideas in an open format and the presentation of up-to-date research results.
8. An internship (P) refers to a specialization of a student's knowledge through practical or research-oriented applications over a specific period or to gaining new knowledge and skills through practical work in an organization, institution, or by contributing to a specific process.
9. Methodology practice sessions (MÜ) enable students to build on their methodological skills, put them into practice in line with scientific criteria, and consolidate already acquired work techniques. The main mode of instruction and learning is the application of different subject-specific methods.
10. Digital seminars (S-PC) serve to impart knowledge of a specific subject area and the ability to independently work on a research question, present the results, and critically discuss them during face-to-face meetings. The primary mode of work is collaborative work on a computer, with the introduction and application of specialized software.

(2) The modes of instruction as outlined in Section 8.1 above can be implemented through blended learning formats. Blended learning combines on-site education with digital, internet-based media (e-learning). In this context, certain educational activities can be offered through Freie Universität Berlin's central e-learning applications. Students can work on these activities individually or in groups. They can complete them on their own or with the guidance of an instructor. Blended learning can be used both as part of the active learning phase (discussing educational materials, sharing solutions to assignments, vigorous communication between instructors and students) and for follow-up activities (evaluating students' progress, applying and transferring knowledge).

§ 9
Master's Thesis

(1) The master's thesis is intended to demonstrate that a student has the ability to work independently on a research problem of their own choice from the field of cognitive neuroscience. They should be able to present their findings in a form that is appropriate to the topic and situate them within an academic context, as well as document their findings in writing and discuss them orally. The master's thesis should involve the collection, simulation, or modeling of data using neurocognitive methods.

(2) Students will be admitted to work on a master's thesis by submitting a request, provided that

1. they were most recently enrolled in a master's degree program at Freie Universität Berlin,
2. and they have successfully completed modules totaling at least 60 credit points in the course of the master's degree program.

(3) The admission request for the master's thesis must be accompanied by proper documentation of the prerequisites listed under Section 9.2. The relevant examination board is responsible for approving requests. The request must be accompanied by a confirmation from an instructor who is an authorized examiner that they are willing and able to act as supervisor for the master's thesis. If the request does not include confirmation from an instructor as described above, the examination board will appoint the student a supervisor. The focus of the supervision is also to provide guidance on complying with the rules of good scientific practice, taking into account the specificities of the respective field of study.

(4) The examination board assigns the topic of the master's thesis in coordination with the thesis supervisor. The topic and assignment must be designed in such a way as to ensure the work can be completed by the deadline. The assignment and compliance with the submission deadline must be documented and kept on file.

(5) The student has 22 weeks to complete and submit the master's thesis. If a student is hindered from working on their master's thesis for more than three months due to mitigating circumstances, the examination board will decide whether the student must start the master's thesis process again. If the examination board demands that the master's thesis be submitted again, the previous steps in the master's thesis process do not count as an official examination attempt.

(6) The work period for the master's thesis begins with the date that the topic is assigned by the examination board. The topic can be declined once within two weeks of being assigned, in which case it will be deemed not issued. When the student submits their master's thesis they must include a written statement confirming that they alone are responsible for the content of the master's thesis and that they only used the sources or references listed in the thesis. Students must submit an electronic copy of their master's thesis in Portable Document Format (PDF). Data sets and syntax files must also be submitted electronically for master's theses based on empirical research.

(7) The master's thesis will be accompanied by a scientific colloquium. Each student presents their master's thesis and stages of progress and reflects upon them under the guidance of the supervisor. Participation in the colloquium is mandatory.

(8) The results of the master's thesis are presented orally and discussed directly after the evaluation.

(9) The master's thesis is to be assessed by two authorized examiners appointed by the examination board, one of whom must be the supervisor of the thesis.

(10) The grade awarded for the written master's thesis constitutes three-fifths of the cumulative grade for the master's thesis, with the grade for the oral presentation constituting two-fifths.

(11) The master's thesis is considered passed if the overall grade awarded is "sufficient" (4.0) or higher.

(12) A student's work on a master's thesis elsewhere can be recognized/transferred to Freie Universität. The recognition request should be submitted to the examination board. In order for the master's thesis to be recognized, the examination conditions and the assignment of the submitted work must not differ substantially in terms of quality, level, learning outcomes, scope, and profile when compared to the examination conditions and the assignment of a master's thesis completed in this master's program, which characterize the type of professional qualification this master's degree program in particular provides.

§ 10
Electronic (Online) Examinations

(1) If examinations are offered in a digital/online format, the examination and grading for the examination will take place using digital technologies.

(2) Deviating or alternative formats to the type of module assessment defined in these degree program and examination regulations – especially digital written exams, take-home exams, term papers, or oral assessments conducted via video conference – are permitted if the module assessment cannot be conducted in the intended format due to extraordinary circumstances, the ramifications of which cannot be compensated in any other way, or conducting the assessment would be unreasonable due to the disproportionate work involved, or doing so would be unreasonable for specific students. The examination board will make the final decision on whether and in which format the module assessment should be conducted. The subject-specific requirements of the module assessment must be upheld. Students are to be immediately informed of any such decisions as well as the format and scope of the assessments to be undertaken, the time of the module assessment, and any submission deadlines.

(3) The identity of the candidate taking the examination and the validity of the examination results must be authenticated. For this purpose, the examination results must be unambiguously identifiable and permanently assignable to the correct student in the digital system. It must be ensured that the electronic data are unchanged and complete for the purposes of grading and verifying the results.

(4) If an examination has been graded automatically via digital means, the student may request that an examiner verifies the result.

§ 11
Multiple-Choice Questions

(1) Multiple choice questions in an examination must be set by two examiners.

(2) If it becomes clear during the grading of multiple-choice questions that certain questions do not fulfill their purpose of obtaining reliable examination results and do not sufficiently reflect the qualification objectives of the relevant module, the grading process must be adjusted so that the examination candidate is not put at a disadvantage in their examination result.

(3) An examination in the form of multiple-choice questions is deemed passed if the candidate receives at least 50 percent of the possible maximum points (absolute passing grade), or if the number of points achieved by the student does not fall more than 10 percent below the average number of points achieved by all candidates who participated in the examination (relative passing grade). If the relative passing grade is used, the candidate must still achieve at least 40 percent of the total possible points in order to pass the examination.

(4) Multiple-choice examinations must be graded as described below. Where the candidate has achieved the minimum number of points as defined under Section 11.3 above, they will be graded according to the following criteria:

- “very good” for a number of points that totals at least 75 percent more than the required minimum number of points under Section 11.3;

- “good” for a number of points that totals at least 50 percent, but less than 75 percent, more than the required number of points under Section 11.3;

- “satisfactory” for a number of points that totals at least 25 percent, but less than 50 percent, more than the required number of points under Section 11.3;

- “sufficient” for a number of points up to 25 percent more than the required minimum number of points under Section 11.3.

For the grading system, please also refer to the framework regulations for degree programs and examinations (RSPO).

(5) The grading requirements stipulated above under 11.3 and 11.4 will not be applied if

1. the examiners who set the questions as described in Section 11.1 are also the examiners responsible for grading the multiple-choice answers, or

2. the proportion of maximum points achievable in the multiple-choice section makes up no more than 25 percent of the examination as a whole where the examination is only partly in multiple-choice format.

§ 12
Retaking Exams and Assessments

(1) If a student does not pass their master’s thesis and final colloquium, they may reattempt the assessment two times. For all other exams and assessments in the program, they can retake them two times.

(2) Exams and assessments that receive a grade of “sufficient” (4.0) or better cannot be retaken.

(3) With regard to retaking the final examination before completion of the degree program, the examination board may decide on the request of the student that the exam to be retaken is held during the same semester as the preceding examination attempt.

§ 13
Study Abroad

(1) Students are encouraged to study abroad. While studying abroad student should pursue courses that can be accredited within the master’s degree program.

(2) Before starting a study abroad program, a learning agreement must be drawn up between the student, the head of the examination board, and the responsible point of contact at the host university. The agreement covers the length of the study abroad period, the coursework to be completed while studying abroad, which must equate to the courses of the master’s degree program in terms of credit points, and the credit points to be allocated to the completed coursework. Coursework completed in accordance with this agreement will be recognized.

(3) The third and fourth semesters in the master’s degree program lend themselves well to study abroad, and students are encouraged to study abroad then..

§ 14
Degree Completion

(1) In order to graduate, students must complete the coursework and assessments outlined in Sections 7 and 9.

(2) A student is not eligible for graduation if they have definitively failed some coursework or assessment or are involved in a pending examination procedure at another university in the same course of study or in a module that is identical or comparable to one of the modules to be completed in the master’s degree program here and that will be taken into account when determining their overall grade.

(3) The application request for the award of a degree must be accompanied by documentation showing the student has completed the requirements mentioned in Section 14.1 as well as a guarantee that the applicant is not subject to any of the eligibility restrictions mentioned in Section 14.2. The relevant examination board is responsible for approving the application.

(4) Upon successful completion of the assessment, the student will receive a Master of Science (M. Sc.) university degree. Students receive a degree certificate and a diploma (appendices 3 and 4), in addition to a diploma supplement (English and German versions). In addition, a degree certificate supplement with details of the individual modules and their components (transcript) is prepared. Additional English versions of the transcript and degree certificate may be issued upon request.

§ 15
Entry into Force and Interim Regulations

(1) This regulation comes into effect on the day following its publication in *FU-Mitteilungen* (the official bulletin of Freie Universität Berlin).

(2) The degree program and examination regulations for the master's degree program of December 10, 2021 (*FU-Mitteilungen* No. 14/2021, p. 179), therefore lapse when the new regulations come into force.

(3) These regulations shall apply for students who were enrolled in the master's program at Freie Universität Berlin after these regulations entered into force. Students who were enrolled in this master's degree program at Freie Universität Berlin before these regulations came into force shall study and complete coursework on the basis of the degree program and examination regulations stated in Section 15.2 above, provided that they do not submit a request to the examination board to continue their degree program and complete coursework pursuant to the currently valid regulations. Should this request be granted, the examination board shall decide on the extent to which modules that the student has already begun or completed at the point in time at which the request was submitted shall be recognized and to what extent they can be accredited under the requirements of the currently valid regulations, whereby the requirements of the right to confidentiality and equal treatment shall be taken into account. The decision concerning the student's entitlement to continue their degree program pursuant to the currently valid regulations will apply from the beginning of the lecture period of the following semester onward. Once the request for continuation under the newest regulations has been approved, it is final and the student may not then apply to transfer their studies back to the previous regulations.

(4) Students are entitled to complete their degree on the basis of the degree program and examination regulations pursuant to Section 15.2 until the end of the 2025 summer semester.

Appendix 1: Module Descriptions

Explanatory notes:
These module descriptions address the following aspects for each module in the master's degree program:

- The name of the module
- The person responsible for the module (module coordinator)
- The prerequisites needed in order to take a particular module
- The module's content and learning objectives
- Modes of instruction used in the module
- The amount of work required by students to successfully complete a module
- Types of active participation
- Types of assessments/examinations
- Whether or not regular attendance is required
- Credits awarded for the module
- Standard duration of the module
- Frequency
- Applicability

The information provided on student workload takes the following factors into account:

- Active participation during class sessions
- Time needed to complete small assignments during class sessions,
- Time needed for students' preparations before class and follow-up work
- Work on study units in online learning sections
- Preparation time required specifically for assessments/examinations
- The time needed for the assessment/examination itself

The amount of time indicated for independent study (including preparing for class, follow-up work, preparing for an exam) are only approximations meant to help students organize their time when planning their workload for modules. The workload information corresponds to the number of credit points assigned to the respective module, which serves as a unit of measurement for the amount of work required to successfully complete the module. One credit point equals 30 hours.

If regular attendance is required for the specific type of instruction, then regular attendance, along with active participation in the instruction and successful completion of assessments, is necessary in order to receive credit points for the specific module. Regular attendance means that a student has attended at least 85% of the instruction in module. If regular attendance is not required in a module, students are still strongly encouraged to attend classes regularly.

Instructors teaching courses in which regular attendance is merely encouraged cannot decide that attendance should be required. For modules that include alternative forms of active participation, the type of participation, which must correspond to the workload allotted for active participation in the respective semester, must be determined by the responsible instructor during the first class period at the latest. To complete each module, the student must complete the module assessment for that module if the module has one. In order to finish a module, only one assessment (module assessment) must be completed. The module assessment is based on the module's learning objectives and serves as a way to test whether the objectives have been achieved. The scope of the assessment covers the components necessary to this end.

For modules that include alternative assessment forms, the type of assessment for the respective semester must be determined by the responsible instructor before the first day of class. Active and (if applicable) regular participation in the instruction and successful completion of assessments are necessary in order to receive credit points for the specific module. If a module does not involve a module assessment, then active and regular participation in the instruction is necessary in order to receive credit points for the specific module.

Module: Cognitive Neuroscience: Perception, Attention, Action, and Cognitive Control

University/department/teaching unit: Freie Universität Berlin/Department of Education and Psychology/Psychology

Module coordinator: Head of Neurocomputation and Neuroimaging

Prerequisites: None

Learning objectives:

The students possess advanced knowledge in neurocognitive psychology in the areas of perception, attention, action, and cognitive control. They are familiar with key theoretical concepts, empirical findings, and practical applications of neurocognitive methods in these areas of cognitive neuroscience. They are able to develop specific research questions based on this knowledge and link them to selected neurocognitive methods (e.g., reaction time measurement, EEG, fMRI, non-invasive neuromodulation techniques/tDCS/TMS) according to the principle of "the methods must fit the questions." They also have the skills to evaluate and interpret empirical studies. They can present and discuss empirical research results in a scientific manner, both individually and as part of a team.

Content:

Students are provided with an introduction to theoretical foundations and important empirical findings from the field of cognitive neuroscience and other related fundamental subjects (such as general and biological psychology) through selected examples. Students gain an overview of the mutually beneficial use of selected neurocognitive methods in conjunction with algorithmic process models and their practical applications. The sensory physiology of vision, hearing, chemical senses, and the somatosensory system are presented and discussed at a level that focuses on their neurophysiological description, with review articles used to present these in relation to subcortical and cortical information processing. Types of attention and their neural mechanisms, as well as the bases of action, decision-making, and cognitive control mechanisms, are presented and discussed based on current review articles.

Modes of instruction	**Contact hours** (hours per week during the semester)	**Types of active participation**	**Workload** (in hours)
Seminar I	2	Discussion and presentation of relevant literature, group work	Class attendance S I 30 Preparation and follow-up S I 70 Class attendance S II 30 Preparation and follow-up S II 70 Examination preparation and examination 100
Seminar II	2		
Module assessment:		Written exam (60 minutes) that is taken alongside the module and can also be completed in the form of an electronic exam (either wholly or partially in multiple-choice format).	
Language:		English	
Regular attendance required:		Yes	
Total workload:		300 hours	10 credit points
Duration:		Two semesters	
Frequency:		Once per academic year	
Applicability:		Master's degree program M. Sc. Cognitive Neuroscience	

Module: Cognitive Neuroscience: Memory, Emotion, Language, and Consciousness

University/department/teaching unit: Freie Universität Berlin/Department of Education and Psychology/Psychology

Module coordinator: Head of Neurocomputation and Neuroimaging

Prerequisites: None

Learning objectives:

Students possess advanced knowledge in neurocognitive psychology in the subject areas: memory, emotions, language, and consciousness. They are familiar with the key theoretical concepts, empirical findings, and practical applications of neurocognitive methods within these fields of cognitive neuroscience. They are able to develop specific research questions based on this knowledge and link them to selected neurocognitive methods (e.g., reaction time measurement, EEG, fMRI, non-invasive neuromodulation techniques/tDCS/TMS) according to the principle of "the methods must fit the questions." They also have the skills to evaluate and interpret empirical studies. They can present and discuss empirical research results in a scientific manner, both individually and as part of a team.

Content:

Selected theoretical foundations and important empirical findings from cognitive neuroscience and related foundational disciplines (e.g., general and biological psychology) are conveyed through selected examples. Students are introduced to the benefits of using selected neurocognitive methods in conjunction with algorithmic process models and their practical applications. The distinction between the memory processes of short-term and long-term memory as well as encoding and retrieval of memory content, the underlying neurobiological processes, and their neuroanatomical classification are also discussed. The neurobiological principles of emotion and language processing and production, as well as their contributions to cognitive processes such as decision-making, are discussed based on review articles. The challenges in defining and operationalizing concepts in cognitive neuroscience are debated based on current research into human consciousness and current research on neural correlates of conscious processes (e.g., sub- and supraliminal stimulus processing, disorders of consciousness, conscious contents, and altered states of consciousness).

Modes of instruction	**Contact hours** (hours per week during the semester)	**Types of active participation**	**Workload** (in hours)	
Seminar I	2	Discussion and presentation of relevant literature, group work	Class attendance S I	30
			Preparation and follow-up S I	70
Seminar II	2		Class attendance S II	30
			Preparation and follow-up S II	70
			Examination preparation and examination	100

Module assessment:	Written exam (60 minutes) that is taken alongside the module and can also be completed in the form of an electronic exam (either wholly or partially in multiple-choice format).	
Language:	English	
Regular participation required:	Yes	
Total workload:	300 hours	10 credits
Duration:	Two semesters	
Frequency:	Once per academic year	
Applicability:	Master's degree program M. Sc. Cognitive Neuroscience	

Module: Cognitive Neuroscience: Research Practice

University/department/teaching unit: Freie Universität Berlin/Department of Education and Psychology/Psychology

Module coordinator: Module instructor

Prerequisites: None

Learning objectives:

Students independently explore and assess research paradigms and current research results in the fundamental disciplines of the neurocognitive sciences in order to use them in their own research and future professional activities. They engage in in-depth exploration of content from current research and method development techniques across various applied fields , including fields related to the cognitive neurosciences (e.g., general psychology, biopsychology, social neuroscience, affective neuroscience, developmental psychology, developmental neuroscience, practical implementation of good scientific practice, and open science). They are capable of assigning basic scientific constructs, paradigms, and neuroscientific research methods to different applied fields of cognitive neuroscience and can evaluate their relevance. The students are able to place research results within a theoretical framework. They are capable of assessing whether empirical findings and observations can contribute toward validating theoretical models.

Attendance of the course provides students with the skills they need to apply basic approaches such as cognitive psychology, developmental and developmental psychopathological, and neuropsychological approaches to concrete aspects of practice, and to derive consequences for the design of appropriate applied fields (e.g., computational psychiatry, clinical psychology, data sciences). This means that they are capable of bridging the gap between basic research and applied fields.

Content:

The module supports students in learning to classify the content of the modules Cognitive “Neuroscience: Perception, Attention, Action and Cognitive Control,” “Cognitive Neuroscience: Memory, Emotion, Language and Consciousness,” and “Neurocognitive Methods and Data Analysis” within a theoretical framework and to evaluate these at a fundamental scientific level. Specifically, the basics of neuroanatomy and current research on the structure of the nervous system are covered in terms of their application. Techniques of good scientific practice, scientific ethics, open science, and scientific writing and presentation of results are addressed. The research approaches that are particularly relevant to practice and their suitability for testing specific hypotheses are critically discussed. Practice sessions allow for the validation of theoretical models, as well as the interconnections between research approaches, to be critically discussed. The specific content of this module will be adapted to reflect the latest developments in current research. Expert lectures on current research findings will be prepared and critically reflected upon based on research reports, for example, from the fields of cognitive neuropsychology, computational neuroscience, theoretical neuroscience, social and affective neuroscience, as well as methodological developments in analysis methods and areas of application focused on data science.

<table>
<tr><th>Modes of instruction</th><th>Contact hours (hours per week during the semester)</th><th>Types of active participation</th><th>Workload (in hours)</th></tr>
<tr><td>Practice session I</td><td>2</td><td rowspan="2">Short presentations and interpretation of research results.</td><td rowspan="2">Class attendance Ü I 30
Preparation and follow-up Ü I 75
Class attendance Ü II 30
Preparation and follow-up Ü II 75
Examination preparation and examination 100</td></tr>
<tr><td>Practice session II</td><td>2</td></tr>
<tr><td colspan="2">Module assessment:</td><td colspan="2">The module examination consists of two written examinations (30 minutes each); the module examination can also be carried out in the form of an electronic examination (either wholly or partially in multiple-choice format, if necessary).
One written exam takes place after the first semester and one written exam after the second semester.</td></tr>
<tr><td colspan="2">Language:</td><td colspan="2">English or German</td></tr>
<tr><td colspan="2">Regular attendance required:</td><td colspan="2">Yes</td></tr>
<tr><td colspan="2">Total workload:</td><td>300 hours</td><td>10 credit points</td></tr>
<tr><td colspan="2">Duration:</td><td colspan="2">Two semesters</td></tr>
<tr><td colspan="2">Frequency:</td><td colspan="2">Once per academic year</td></tr>
<tr><td colspan="2">Applicability:</td><td colspan="2">Master’s degree program M. Sc. Cognitive Neuroscience</td></tr>
</table>

Module: Neurocognitive Methods and Data Analysis

University/department/teaching unit: Freie Universität Berlin/Department of Education and Psychology/Psychology

Module coordinator: Head of Neurocomputation and Neuroimaging

Prerequisites: None

Learning objectives:

Students acquire essential theoretical background knowledge for the practical implementation and evaluation of experimental studies in cognitive neuroscience. They obtain knowledge about the most common measurement methods, experimental designs, and intervention methods used in current neurocognitive research (e.g., reaction time measurement, oculomotor and pupillometry, EEG, fMRI, fNIRS, non-invasive neuromodulation techniques/tDCS/rTMS). They are familiar with the physical, neurobiological, and data analytic foundations of typical neurocognitive methods, with a focus on magneto- and electroencephalography (M/EEG) and functional magnetic resonance imaging (fMRI). The students are capable of critically reflecting on the possibilities and limitations of typical neurocognitive methods and interpreting research results obtained through neurocognitive methods in the context of neurocognitive theories.

Content:

This module makes use of review articles and advanced literature to provide an overview of current neurocognitive methods and typical experimental designs . Basic aspects of neurophysiology and M/EEG signal generation, recording, and analysis are taught. An introduction to fMRI is provided through use of a textbook and further literature, and basic aspects of fMRI signal generation, recording, and analysis also form part of the curriculum. Students analyze M/EEG and fMRI datasets and create analysis scripts for data processing.

Modes of instruction	**Contact hours** (hours per week during the semester)	**Types of active participation**	**Workload** (in hours)
Lecture	2	Group discussions, programming exercises, presentations, and written summaries	Class attendance V 30 Preparation and follow-up V 70 Class attendance PrS 30 Preparation and follow-up PrS 70 Examination preparation and examination 100
Practical seminar	2		
Module assessment:		Written exam (45 minutes), which can also be conducted in the form of an electronic test (either wholly or partially in multiple-choice format). The exam takes place after the first semester.	
Language:		English	
Regular attendance required:		Practical seminar: Yes; Lecture: Participation is recommended.	
Total workload:		300 hours	10 credit points
Duration:		Two semesters	
Frequency:		Once per academic year	
Applicability:		Master's degree program M. Sc. Cognitive Neuroscience	

Module: Probabilistic and Statistical Modeling

University/department/teaching unit: Freie Universität Berlin/Department of Education and Psychology/Psychology

Module coordinator: Module instructor

Prerequisites: None

Learning objectives:

Students are able to critically reflect on mathematical formulations of data analytical methods within the cognitive neurosciences. They have a functional understanding and formal knowledge of common statistical and model-based paradigms used to analyze imaging data. Students are also able to use this knowledge to evaluate and plan empirical investigations, particularly in the research areas of cognitive neuroscience, and are aware of the significance and limitations thereof.

Content:

Building upon the knowledge gained in previous studies, students deepen their understanding of the following topics: correlation and regression, multiple and logistic regression, application of the general linear model and multilevel models, frequentist and Bayesian reasoning with approaches to control error rates (especially type 1 errors). Students gain experience in practically applying their knowledge of multivariate analysis methods using data set examples from cognitive neuroscience while under supervision, and are also able to gain experience with approaches based on machine learning. Advanced methods of neuroimaging data analysis such as biophysical modeling approaches (e.g., psychophysiological interactions, dynamic causal modeling, etc.) are implemented in programming languages such as Matlab, RStudio, or Python using toolbox implementations.

Modes of instruction	**Contact hours** (Hours per week per semester = HWS)	**Types of active participation**	**Workload** (in hours)	
Advanced lecture	2	Group discussion	Class attendance VV	30
			Preparation and follow-up VV	70
			Class attendance S-PC	30
Digital seminar	2		Preparation and follow-up S-PC	70
			Examination preparation and examination	100
Module examination:		Written exam (45 minutes), which can also be conducted in the form of an electronic test (either wholly or partially in multiple-choice format). The exam takes place after the first semester.		
Language:		English		
Regular attendance required:		Digital seminar: Yes; Advanced lecture: Participation is recommended.		
Total workload:		300 hours	10 credit points	
Duration:		Two semesters		
Frequency:		Once per academic year		
Applicability:		Master's degree program M. Sc. Cognitive Neuroscience		

Module: Introduction to Programming

University/department/teaching unit: Freie Universität Berlin/Department of Education and Psychology/Psychology

Module coordinator: Module instructor

Prerequisites: None

Learning objectives:

Students acquire essential theoretical background knowledge for the practical implementation and evaluation of experimental studies in cognitive neuroscience. Specifically, they have gained practical knowledge and experience in imperative and object-oriented programming using a programming language and are aware of the importance of programming skills in neurocognitive research.

Content:

In accordance with current developments in cognitive neuroscience, students hone their practical skills in programming with RStudio, MATLAB, Python, or similar programming languages – skills that are currently highly sought after. They gain practical experience in managing empirical data and analysis methods, building on the theoretical introduction to this they have gained in the modules "Neurocognitive Methods and Data Analysis" and "Probabilistic and Statistical Modeling." The focus is on the application of imperative programming in neurocognitive research. In particular, students practice the implementation of scripts for stimulus presentation (e.g., precise presentation of visual stimuli), data acquisition (e.g., response behavior, reaction times), data visualization, and statistical evaluation (e.g., output of charts, calculation of inferential statistics). Additionally, principles of data management (e.g., management of research data) in accordance with good scientific practice, as well as the cooperative use of development platforms (e.g., Github) and principles of publication and the availability of programming code in the sense of open science, are also practiced.

Modes of instruction	**Contact hours** (hours per week during the semester)	**Types of active participation**	**Workload** (in hours)
Digital seminar	2	Programming exercises, presentation and written summary	Class attendance S-PC 30 Preparation and follow-up S-PC 70 Programming project 50

Module assessment:	None	
Language:	English	
Regular attendance required:	Yes	
Total workload:	150 hours	5 credit points
Duration:	One semester	
Frequency:	Every winter semester	
Applicability:	Master's degree program M. Sc. Cognitive Neuroscience	

Module: Neurocognitive Methods Practical

University/department/teaching unit: Freie Universität Berlin/Department of Education and Psychology/Psychology

Module coordinator: Head of Neurocomputation and Neuroimaging

Prerequisites: None

Learning objectives:

The students have practical knowledge regarding experimental planning and implementation and their application in the fields of social, affective, and cognitive neuroscience. They master the theoretical foundations and practical application possibilities of neuro-cognitive methods on the basis of selected examples. In addition, they are familiar with independent data collection and concrete evaluation (using appropriate software such as SPM or FSL). They are able to use this knowledge to develop research questions and their empirical implementation and to present and discuss both in oral and written form. Thus, important techniques of scientific work are practiced and teamwork and communication skills are trained.

Content:

Based on the basic knowledge acquired in the module Neurocognitive Methods and Data Analysis, the module deals with the practical application possibilities of neurocognitive methods. In particular, the application-oriented data collection and practical analysis with standardized methods (SPM, FSL, etc.) are covered. Univariate as well as multivariate analyses of fMRI data and EEG data are discussed in detail and methods for the analysis of structural and functional connectivity are presented. The practical application of the analysis procedures as well as the interpretation of the resulting results against the background of scientific initial hypotheses and theories will be explicitly practiced.

Modes of instruction	**Contact hours** (hours per week during the semester)	**Types of active participation**	**Workload** (in hours)
Practical seminar	2	Exercises for data acquisition and evaluation, presentation of findings	Class attendance PrS 30 Preparation and follow-up PrS 70 Examination preparation and examination 50
Module assessment:		Written report (approx. 10 pages)	
Language:		English	
Regular attendance required:		Yes	
Total workload:		150 hours	5 credit points
Duration:		One semester	
Frequency:		Every winter semester	
Applicability:		Master's degree program M. Sc. Cognitive Neuroscience	

<table>
<tr><td colspan="4">Module: Research Workshop</td></tr>
<tr><td colspan="4">University/department/teaching unit: Freie Universität Berlin/Department of Education and Psychology/Psychology</td></tr>
<tr><td colspan="4">Module coordinator: Head of Neurocomputation and Neuroimaging</td></tr>
<tr><td colspan="4">Prerequisites: None</td></tr>
<tr><td colspan="4">Learning objectives:
The students master the subject-specific research methodology and know international research findings. They are able to actively and independently plan and conduct their own research projects. The students are able to interpret results based on theory and hypotheses, to critically classify them against the background of the international research basis, and to present them in oral and written form.</td></tr>
<tr><td colspan="4">Content:
With a background in current neurocognitive theories and hypotheses, students will develop their own research questions in the social, cognitive and affective neurosciences and present them orally and in writing. They will also practice and critically reflect on the methodological and interpretative principles necessary for their empirical verification.</td></tr>
<tr><td>Modes of instruction</td><td>Contact hours (hours per week during the semester)</td><td>Types of active participation</td><td>Workload
(in hours)</td></tr>
<tr><td>Teaching Research Project</td><td>2</td><td rowspan="2">Presentation and project summary on a topic selected by the student</td><td rowspan="2">Class attendance LFP 30
Preparation and follow-up LFP 60
Class attendance MÜ 30
Preparation and follow-up MÜ 30</td></tr>
<tr><td>Methodology Practice Session</td><td>2</td></tr>
<tr><td colspan="2">Module assessment:</td><td colspan="2">None</td></tr>
<tr><td colspan="2">Language:</td><td colspan="2">English</td></tr>
<tr><td colspan="2">Regular attendance required:</td><td colspan="2">Yes</td></tr>
<tr><td colspan="2">Total workload:</td><td>150 hours</td><td>5 credit points</td></tr>
<tr><td colspan="2">Duration:</td><td colspan="2">One semester</td></tr>
<tr><td colspan="2">Frequency:</td><td colspan="2">Every winter semester</td></tr>
<tr><td colspan="2">Applicability:</td><td colspan="2">Master’s degree program M. Sc. Cognitive Neuroscience</td></tr>
</table>

Module: Research Experience

University/department/teaching unit: Freie Universität Berlin/Department of Education and Psychology/Psychology

Module coordinator: Head of Neurocomputation and Neuroimaging

Prerequisites: None

Learning objectives:

In the research internship, students test and expand the content-related and methodological competencies they have acquired in the subject modules. They know possible fields of activity and requirements in research institutions and are able to deal with institutional conditions. They have expanded their teamwork and communication skills, including their gender- and diversity-specific aspects, and have practiced the various forms of scientific work.

Content:

The research internship takes place in a domestic or foreign research institution under the guidance of an experienced scientist. The possible fields of application are very diverse and lie within the entire spectrum of neuroscientific research. Students are actively involved in the research process and participate in the theory-driven design, planning, execution, statistical analysis, interpretation and experimental or theoretical/simulation-based studies.

Modes of instruction	**Contact hours** (in hours)	**Types of active participation**	**Workload** (in hours)
Internship	300	Completion of internship, presentations of progress made in individual work, internship report.	Attendance including preparation and follow-up 300

Module assessment:	None	
Language:	English (other languages as required)	
Regular attendance required:	Yes	
Total workload:	300 hours	10 credit points
Duration:	One semester	
Frequency:	Every winter and summer semester	
Applicability:	Master's degree program M. Sc. Cognitive Neuroscience	

Elective Modules

<table>
<tr><td colspan="4">Module: Applied MRI/fMRI: Data Modeling</td></tr>
<tr><td colspan="4">University/department/teaching unit: Freie Universität Berlin/Department of Education and Psychology/Psychology</td></tr>
<tr><td colspan="4">Module coordinator: Head of Neurocomputation and Neuroimaging</td></tr>
<tr><td colspan="4">Prerequisites: None</td></tr>
<tr><td colspan="4">Learning objectives:
Students acquire practical knowledge in the application of current data modeling methods for data obtained through magnetic resonance imaging (MRI) and functional magnetic resonance imaging (fMRI).</td></tr>
<tr><td colspan="4">Content:
Building upon the module “Neurocognitive Methods and Data Analysis,” students develop and apply their methodological, analytical, and data modeling skills for processing data from MRI/fMRI studies.</td></tr>
<tr><td>Modes of instruction</td><td>Contact hours (hours per week during the semester)</td><td>Types of active participation</td><td>Workload
(in hours)</td></tr>
<tr><td>Digital Seminar</td><td>2</td><td>Programming exercises, presentation and written summary</td><td>Class attendance S-PC 30
Preparation and follow-up S-PC 70
Examination preparation and examination 50</td></tr>
<tr><td colspan="2">Module assessment:</td><td colspan="2">Written exam (30 minutes), which can also be conducted in the form of an electronic test (either wholly or partially in multiple-choice format), a term paper (approx. 8 pages), or an oral exam (approx. 10 minutes).
This module assessment is not graded on a differentiated basis.</td></tr>
<tr><td colspan="2">Language:</td><td colspan="2">English</td></tr>
<tr><td colspan="2">Regular attendance required:</td><td colspan="2">Yes</td></tr>
<tr><td colspan="2">Total workload:</td><td>150 hours</td><td>5 credit points</td></tr>
<tr><td colspan="2">Duration:</td><td colspan="2">One semester</td></tr>
<tr><td colspan="2">Frequency:</td><td colspan="2">Every winter semester, partly during the semester and partly during the semester break as a block course.</td></tr>
<tr><td colspan="2">Applicability:</td><td colspan="2">Master’s degree program M. Sc. Cognitive Neuroscience</td></tr>
</table>

Module: Applied MRI/fMRI: Advanced Data Modeling			
University/department/teaching unit: Freie Universität Berlin/Department of Education and Psychology/Psychology			
Module coordinator: Head of Neurocomputation and Neuroimaging			
Prerequisites: None			
Learning objectives: Students gain advanced practical knowledge in the application of current data modeling methods for data obtained through magnetic resonance imaging (MRI) and functional magnetic resonance imaging (fMRI)			
Content: Building upon the modules “Neurocognitive Methods and Data Analysis” and “Applied MRI/fMRI: Data Modeling,” students develop and apply their methodological, analytical, and data modeling skills for processing data from MRI/fMRI studies at a more complex, advanced level.			
Modes of instruction	**Contact hours** (hours per week during the semester)	**Types of active participation**	**Workload** (in hours)
Digital Seminar	2	Programming exercises, presentation and written summary	Class attendance S-PC 30 Preparation and follow-up S-PC 70 Examination preparation and examination 50
Module assessment:		Written exam (30 minutes), which can also be conducted in the form of an electronic test (either wholly or partially in multiple-choice format), or a term paper (approx. 8 pages) or an oral exam (approx. 10 minutes). This module assessment is not graded on a differentiated basis.	
Language:		English	
Regular attendance required:		Yes	
Total workload:		150 hours	5 credit points
Duration:		One semester	
Frequency:		Every winter semester, partly during the semester and partly during the lecture-free period as a block course.	
Applicability:		Master’s degree program M. Sc. Cognitive Neuroscience	

<table>
<tr><td colspan="4">Module: Applied EEG: Data Modeling</td></tr>
<tr><td colspan="4">University/department/teaching unit: Freie Universität Berlin/Department of Education and Psychology/Psychology</td></tr>
<tr><td colspan="4">Module coordinator: Head of Neurocomputation and Neuroimaging</td></tr>
<tr><td colspan="4">Prerequisites: None</td></tr>
<tr><td colspan="4">Learning objectives:
Students gain practical knowledge in the application of current data modeling methods for data obtained through electroencephalography (EEG).</td></tr>
<tr><td colspan="4">Content:
Building upon the module “Neurocognitive Methods and Data Analysis,” students develop and apply their methodological, analytical, and data modeling skills for processing data from EEG studies.</td></tr>
<tr><td>Modes of instruction</td><td>Contact hours (hours per week during the semester)</td><td>Types of active participation</td><td>Workload
(in hours)</td></tr>
<tr><td>Digital Seminar</td><td>2</td><td>Programming exercises, presentation and written summary</td><td>Class attendance S-PC 30
Preparation and follow-up S-PC 70
Examination preparation and examination 50</td></tr>
<tr><td colspan="2">Module assessment:</td><td colspan="2">Written exam (30 minutes), which can also be conducted in the form of an electronic test (either wholly or partially in multiple-choice format), a term paper (approx. 8 pages), or an oral exam (approx. 10 minutes).
This module assessment is not graded on a differentiated basis.</td></tr>
<tr><td colspan="2">Language:</td><td colspan="2">English</td></tr>
<tr><td colspan="2">Regular attendance required:</td><td colspan="2">Yes</td></tr>
<tr><td colspan="2">Total workload:</td><td>150 hours</td><td>5 credit points</td></tr>
<tr><td colspan="2">Duration:</td><td colspan="2">One semester</td></tr>
<tr><td colspan="2">Frequency:</td><td colspan="2">Every winter semester, partly during the semester and partly during the semester break as a block course.</td></tr>
<tr><td colspan="2">Applicability:</td><td colspan="2">Master’s degree program M. Sc. Cognitive Neuroscience</td></tr>
</table>

Module: Applied EEG: Advanced Data Modeling			
University/department/teaching unit: Freie Universität Berlin/Department of Education and Psychology/Psychology			
Module coordinator: Head of Neurocomputation and Neuroimaging			
Prerequisites: None			
Learning objectives: Students gain advanced practical knowledge in the application of current data modeling methods for data obtained through electroencephalography (EEG).			
Content: Building upon the modules “Neurocognitive Methods and Data Analysis” and “Applied EEG: Data Modeling,” students develop and apply their methodological, analytical, and data modeling skills for processing data from EEG studies at a more complex, advanced level.			
Modes of instruction	**Contact hours** (hours per week during the semester)	**Types of active participation**	**Workload** (in hours)
Digital Seminar	2	Programming exercises, presentation and written summary	Class attendance S-PC 30 Preparation and follow-up S-PC 70 Examination preparation and examination 50
Module assessment:		Exam (30 minutes), which can also be conducted in the form of an electronic test (possibly completely or partially using the multiple-choice format), or a term paper (approx. 8 pages) or an oral exam (approx. 10 minutes). This module exam is not graded on a differentiated basis.	
Language:		English	
Regular attendance required:		Yes	
Total workload:		150 hours	5 credit points
Duration:		One semester	
Frequency:		Irregular	
Applicability:		Master’s degree program M. Sc. Cognitive Neuroscience	

<table>
<tr><td colspan="4">Module: Applied Cognitive Neuroscience Methods: Data Modeling</td></tr>
<tr><td colspan="4">University/department/teaching unit: Freie Universität Berlin/Department of Education and Psychology/Psychology</td></tr>
<tr><td colspan="4">Module coordinator: Module instructor</td></tr>
<tr><td colspan="4">Prerequisites: None</td></tr>
<tr><td colspan="4">Learning objectives:
Students gain practical knowledge in the application of current data modeling methods for data obtained through neurocognitive methods (e.g., eyetracking, transcranial magnetic stimulation, near-infrared spectroscopy, behavioral investigations).</td></tr>
<tr><td colspan="4">Content: Building upon the module “Neurocognitive Methods and Data Analysis,” students develop and apply their methodological, analytical, and data modeling skills for processing data obtained through neurocognitive methods.</td></tr>
<tr><td>Modes of instruction</td><td>Contact hours (hours per week during the semester)</td><td>Types of active participation</td><td>Workload
(in hours)</td></tr>
<tr><td>Digital Seminar</td><td>2</td><td>Programming exercises, presentation and written summary</td><td>Class attendance S-PC 30
Preparation and follow-up S-PC 70
Examination preparation and examination 50</td></tr>
<tr><td colspan="2">Module assessment:</td><td colspan="2">Written exam (30 minutes), which can also be conducted in the form of an electronic test (either wholly or partially in multiple-choice format), a term paper (approx. 8 pages), or an oral exam (approx. 10 minutes).
This module assessment is not graded on a differentiated basis.</td></tr>
<tr><td colspan="2">Language:</td><td colspan="2">English</td></tr>
<tr><td colspan="2">Regular attendance required:</td><td colspan="2">Yes</td></tr>
<tr><td colspan="2">Total workload:</td><td>150 hours</td><td>5 credit points</td></tr>
<tr><td colspan="2">Duration:</td><td colspan="2">One semester</td></tr>
<tr><td colspan="2">Frequency:</td><td colspan="2">Irregular</td></tr>
<tr><td colspan="2">Applicability:</td><td colspan="2">Master’s degree program M. Sc. Cognitive Neuroscience</td></tr>
</table>

<table>
<tr><td colspan="4">Module: Applied Cognitive Neuroscience Methods: Advanced Data Modeling</td></tr>
<tr><td colspan="4">University/department/teaching unit: Freie Universität Berlin/Department of Education and Psychology/Psychology</td></tr>
<tr><td colspan="4">Module coordinator: Module instructor</td></tr>
<tr><td colspan="4">Prerequisites: None</td></tr>
<tr><td colspan="4">Learning objectives:
Students gain advanced practical knowledge in the application of current data modeling methods for data obtained through neurocognitive methods (e.g., eyetracking, transcranial magnetic stimulation, near-infrared spectroscopy, behavioral investigations).</td></tr>
<tr><td colspan="4">Content:
Building upon the module “Neurocognitive Methods and Data Analysis,” students develop and apply their methodological, analytical, and data modeling skills for processing data obtained through neurocognitive methods at a more complex, advanced level.</td></tr>
<tr><td>Modes of instruction</td><td>Contact hours (hours per week during the semester)</td><td>Types of active participation</td><td>Workload
(in hours)</td></tr>
<tr><td>Digital Seminar</td><td>2</td><td>Programming exercises, presentation and written summary</td><td>Class attendance S-PC 30
Preparation and follow-up S-PC 70
Examination preparation and examination 50</td></tr>
<tr><td colspan="2">Module assessment:</td><td colspan="2">Written exam (30 minutes), which can also be conducted in the form of an electronic test (either wholly or partially in multiple-choice format), a term paper (approx. 8 pages), or an oral exam (approx. 10 minutes).
This module assessment is not graded on a differentiated basis.</td></tr>
<tr><td colspan="2">Language:</td><td colspan="2">English</td></tr>
<tr><td colspan="2">Regular attendance required:</td><td colspan="2">Yes</td></tr>
<tr><td colspan="2">Total workload:</td><td>150 hours</td><td>5 credit points</td></tr>
<tr><td colspan="2">Duration:</td><td colspan="2">One semester</td></tr>
<tr><td colspan="2">Frequency:</td><td colspan="2">Irregular</td></tr>
<tr><td colspan="2">Applicability:</td><td colspan="2">Master’s degree program M. Sc. Cognitive Neuroscience</td></tr>
</table>

Module: Applied Cognitive Neuroscience			
University/department/teaching unit: Freie Universität Berlin/Department of Education and Psychology/Psychology			
Module coordinator: Module instructor			
Prerequisites: None			
Learning objectives: Students acquire essential theoretical background knowledge and practical skills regarding the application of common approaches in the fields of cognitive neuroscience in current research. They develop the ability to contextualize and critically evaluate current research literature to derive new research questions.			
Content: Building upon the module “Cognitive Neuroscience: Research Practice,” students deepen their knowledge of current research in a specific field of cognitive neuroscience (e.g., general psychology, biopsychology, social neuroscience, affective neuroscience, developmental psychology, developmental neuroscience, practical implementation of good scientific practice and open science). The exact content of the module are flexible and adapted to current research topics and trends.			
Modes of instruction	**Contact hours** (hours per week during the semester)	**Types of active participation**	**Workload** (in hours)
Seminar	2	Programming exercises, presentation and written summary	Class attendance S 30 Preparation and follow-up 70 Examination preparation and examination 50
Module assessment:		Written exam (30 minutes), which can also be conducted in the form of an electronic test (either wholly or partially in multiple-choice format), a term paper (approx. 8 pages), or an oral exam (approx. 10 minutes). This module assessment is not graded on a differentiated basis.	
Language:		English	
Regular attendance required:		Yes	
Total workload:		150 hours	5 credit points
Duration:		One semester	
Frequency:		Irregular	
Applicability:		Master’s degree program M. Sc. Cognitive Neuroscience	

Module: Applied Theoretical Neuroscience			
University/department/teaching unit: Freie Universität Berlin/Department of Education and Psychology/Psychology			
Module coordinator: Module instructor			
Prerequisites: None			
Learning objectives: Students acquire essential theoretical background knowledge and practical skills regarding the application of common approaches in the fields of cognitive neuroscience in current research. They have developed the ability to contextualize and critically evaluate current research literature to derive new research questions.			
Content: Building on the contents of the modules “Neurocognitive Methods and Data Analysis” and “Probabilistic and Statistical Modeling,” students examine current theoretical models of neural processes (e.g., simulation of neuron behavior, mathematical formulation of neural networks) and put these into practice in relation to their mathematical formulation and simulation in current research.			
Modes of instruction	**Contact hours** (hours per week during the semester)	**Types of active participation**	**Workload** (in hours)
Digital Seminar	2	Programming exercises, presentation and written summary	Class attendance S-PC 30 Preparation and follow-up S-PC 70 Examination preparation and examination 50
Module assessment:		Written exam (30 minutes), which can also be conducted in the form of an electronic test (either wholly or partially in multiple-choice format), a term paper (approx. 8 pages), or an oral exam (approx. 10 minutes). This module assessment is not graded on a differentiated basis.	
Language:		English	
Regular attendance required:		Yes	
Total workload:		150 hours	5 credit points
Duration:		One semester	
Frequency:		Irregular	
Applicability:		Master’s degree program M. Sc. Cognitive Neuroscience	

Module: Applied Computational Cognitive Neuroscience			
University/department/teaching unit: Freie Universität Berlin/Department of Education and Psychology/Psychology			
Module coordinator: Module instructor			
Prerequisites: None			
Learning objectives: Students acquire essential theoretical background knowledge and practical skills on the application of common approaches in Computational Cognitive Neuroscience in current research. They are aware of the importance of different modeling approaches for neuroscientific conclusions and are able to mathematically formulate and computationally implement various modeling approaches in an experimental context.			
Content: Building upon the contents of the modules “Neurocognitive Methods and Data Analysis” and “Probabilistic and Statistical Modeling,” students gain practical experience with current analysis and modeling methods in Computational Cognitive Neuroscience, such as Markov decision processes, partially observable Markov decision processes, reinforcement learning, drift-diffusion reaction time models, biophysical network models, and neural networks.			
Modes of instruction	**Contact hours** (hours per week during the semester)	**Types of active participation**	**Workload** (in hours)
Digital Seminar	2	Programming exercises, presentation and written summary	Class attendance S-PC 30 Preparation and follow-up S-PC 70 Examination preparation and examination 50
Module assessment:		Written exam (30 minutes), which can also be conducted in the form of an electronic test (either wholly or partially in multiple-choice format), a term paper (approx. 8 pages), or an oral exam (approx. 10 minutes). This module assessment is not graded on a differentiated basis.	
Language:		English	
Regular attendance required:		Yes	
Total workload:		150 hours	5 credit points
Duration:		One semester	
Frequency:		Irregular	
Applicability:		Master’s degree program M. Sc. Cognitive Neuroscience	

Translation 02.05.2023 FU-Mitteilung No. 5/2023 date 10.03.2023

Appendix 2: Example study schedule for master's course in Cognitive Neuroscience

<table>
<tr><th>Semester</th><th colspan="6">Module and Credits</th></tr>
<tr><td>1. Semester Winter 30 Credits</td><td rowspan="2">Cognitive Neuroscience: Perception, Attention, Action and Cognitive Control 10 Credits</td><td rowspan="2">Cognitive Neuroscience: Memory, Emotion, Language and Consciousness 10 Credits</td><td rowspan="2">Cognitive Neuroscience: Research Practice 10 Credits</td><td rowspan="2">Neurocognitive Methods and Data Analysis 10 Credits</td><td rowspan="2">Probabilistic and Statistical Modelling 10 Credits</td><td>Introduction to Programming 5 Credits</td></tr>
<tr><td>2. Semester Summer 30 Credits</td><td>Neurocognitive Methods Practical 5 Credits</td></tr>
<tr><td>3. Semester Winter 30 Credits</td><td colspan="3">Elective Module 15 Credits</td><td>Research Workshop 5 Credits</td><td colspan="2">Research Experience 10 Credits</td></tr>
<tr><td>4. Semester Summer 30 Credits</td><td colspan="6">Master`s thesis and oral examination 30 Credits</td></tr>
</table>