Module for Neurocognitive Psychology

**Mastermodule**

psy110 - Research methods

<table>
<thead>
<tr>
<th>Module label</th>
<th>Research methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>psy110</td>
</tr>
<tr>
<td>Credit points</td>
<td>12.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>360 h</td>
</tr>
<tr>
<td>Used in course of study</td>
<td>Master Neurocognitive Psychology &gt; Mastermodule</td>
</tr>
<tr>
<td>Contact person</td>
<td>Module responsibility</td>
</tr>
<tr>
<td></td>
<td>Andrea Hildebrandt</td>
</tr>
<tr>
<td>Entry requirements</td>
<td>Enrolment in Master's programme Neurocognitive Psychology.</td>
</tr>
</tbody>
</table>

**Skills to be acquired in this module**

**Goals of module:**
Students will acquire basic knowledge in planning empirical investigations, setting up computer controlled experiments, managing and understanding quantitative data and conducting a wide variety of multivariate statistical analyses. They will learn how to use the statistical methodology in terms of good scientific practice and how to interpret, evaluate and synthesize empirical results from the perspective of statistical modeling and statistical learning in basic and applied research context. The courses in this module will additionally point out statistical misconceptions and help students to overcome them.

**Competencies:**
- Interdisciplinary knowledge & thinking
- Statistics & scientific programming
- Data presentation & discussion
- Independent research
- Scientific literature
- Ethics / good scientific practice / professional behavior
- Critical & analytical thinking
- Scientific communication skills
- Group work

**Module contents**

**Part 1: Multivariate Statistics I (lecture)**

- Graphical representation of data
- Basic concepts of probability
- Frequentist and Bayesian statistical inference
- The Generalized Linear Modeling framework (Simple, multiple and moderated linear regression, analyses of variance as a specific case of the General Linear Model, Logistic regression)
- Multilevel regression
- Path modeling
- Factor analysis (exploratory & confirmatory)
- Structural equation modeling

**Part 2: Computer-controlled experimentation (seminar)**

- Computer hardware basics
- Scripting and programming in Presentation
- Combining stimulus delivery with EEG
- Temporal precision

**Part 3: Multivariate Statistics II (lecture)**

- Supervised and unsupervised statistical learning and prediction
- Regularized regression and non-linear models
- Resampling methods
- Tree-based methods and Support Vector Machines
- Principal components and clustering

**Part 4: Evaluation research (seminar)**

- Paradigms and methods in applied evaluation research (quantitative, mixed-methods)
- Types of studies and designs in evaluation research (experimental, quasi-experimental, (multiple) time series, etc.)
- Specific statistical tools (e.g., Propensity score matching)
Research synthesis and meta-analysis

Reader's advisory

Links

Language of instruction
English

Duration (semesters)
2 Semester

Module frequency
The module will be offered every winter term.

Module capacity
unlimited

Modullevel
MM (Mastermodul / Master module)

Modulart
Pflicht / Mandatory

Lern-Lehrform / Type of program
Parts 1 and 3: lectures; Parts 2 and 4: seminars; additional tutorials are offered.

Vorkenntnisse / Previous knowledge
basic statistics; otherwise please attend Introductory Course Statistics

Examination
The module will be tested with an oral exam (20 min). Bonus for creating a script for the presentation on experimental stimuli in part 2.

Course type
Comment
SWS
Frequency
Workload attendance

Lecture
part 1: 8 semester hours per week in the second half of the winter term, part 3: 2 semester hours per week in summer term
6.00
SuSe and WiSe
84 h

Seminar
Part 2: 2 semester hours per week in the winter term. Part 4: 2 semester hours per week in summer term
4.00
SuSe and WiSe
56 h

Tutorial
winter term: 2 hours/week (statistics) summer term: 2 x 2 hours/week (statistics and R)
0.00
SuSe and WiSe
0 h

Total time of attendance for the module
140 h
psy120 - Psychological diagnostics

Module label: Psychological diagnostics
Module code: psy120
Credit points: 9.0 KP
Workload: 270 h
Used in course of study: Master Neurocognitive Psychology > Mastermodule

Contact person:
- Module responsibility
  - Andrea Hildebrandt
  - Andreas Hellmann
- Authorized examiners
  - Andrea Hildebrandt
  - Andreas Hellmann
- Module counseling
  - Stefan Debener

Entry requirements:
Enrolment in Master's programme Neurocognitive Psychology.

Skills to be acquired in this module:
Goals of module:
Students will acquire specific knowledge about psychological assessment and will be trained to utilize this knowledge within a research context and in applied settings. With respect to research applications they will learn about traditional and modern test theories and about their usage in the domain of test construction and the systematic design of interviews and observational methods. From the perspective of applied assessment, students will reflect on the assessment process as a whole. They will learn how to analyze cases ("case conceptualization"), how to plan and conduct the information assessment phase, how to record and summarize collected data and how to integrate across the multitude of information in order to draw conclusions about the case given specific diagnostic strategies (status vs. process assessment and norm oriented vs. criterion oriented assessment, including classificatory decisions). Finally, students will learn about the requirements of report generation in written an oral form given a specific applied context. Ethical guidelines and quality norms will be an implicit topic in all courses in the module.

Competencies:
- Neuropsychological / neurophysiological knowledge
- Interdisciplinary knowledge & thinking
- Ethics / good scientific practice / professional behavior
- Critical & analytical thinking

Module contents:
Part 1: Introduction to Psychological Assessment (lecture)
- Psychological assessment as a decision process – descriptive and prescriptive models
- Theories of reliability (classical and modern approaches)
- Theories of validity (classical and modern approaches)
- Assessment methods, their construction and design, quality criteria
- The logic of decision making in the assessment process
- Psychometrics to single cases
- Summarizing results and writing reports

Part 2: Psychological Testing (seminar)
- Psychometric bases of tests and questionnaires
- Types of tests and questionnaires
- Challenges in psychological testing (for example faking good vs. bad)
- Examples of published tests and questionnaires
- Exercising test applications, scoring and result interpretations

Part 3: Assessment in Clinical Neuropsychology (seminar)
- specific knowledge
- exercises in testing / practising tests

Reader's advisory:
Will be specified in the courses.

Links:
Language of instruction: English
Duration (semesters): 2 Semester
<table>
<thead>
<tr>
<th>Module frequency</th>
<th>The module will be offered every winter term.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module capacity</td>
<td>unlimited</td>
</tr>
<tr>
<td>Reference text</td>
<td>If you want to earn the bonus, you need to use the official bonus sheet to prove your attendance which will be handed to you in the beginning of the winter term.</td>
</tr>
<tr>
<td>Module level</td>
<td>MM (Mastermodul / Master module)</td>
</tr>
<tr>
<td>Modulart</td>
<td>Pflicht / Mandatory</td>
</tr>
<tr>
<td>Lern-/Lehrform / Type of program</td>
<td>Part 1: 1 lecture ; Part 2: 1 seminar; Part 3: 1 seminar</td>
</tr>
</tbody>
</table>

### Vorkenntnisse / Previous knowledge

<table>
<thead>
<tr>
<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final exam of module</td>
<td>summer term</td>
<td>The module will be tested by a practical exercise (test application and protocol). Bonus for two presentations or test executions (max.) and attendance of at least 70% in the seminars. Group presentations can be counted as one half.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td></td>
<td>2.00</td>
<td>WiSe</td>
<td>28 h</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td>4.00</td>
<td>SuSe</td>
<td>56 h</td>
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</tbody>
</table>

**Total time of attendance for the module** 84 h
psy130 - Communication of scientific results

<table>
<thead>
<tr>
<th>Module label</th>
<th>Communication of scientific results</th>
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</thead>
<tbody>
<tr>
<td>Module code</td>
<td>psy130</td>
</tr>
<tr>
<td>Credit points</td>
<td>6.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>180 h</td>
</tr>
<tr>
<td>Used in course of study</td>
<td>• Master Neurocognitive Psychology &gt; Mastermodule</td>
</tr>
<tr>
<td>Contact person</td>
<td></td>
</tr>
<tr>
<td>Module responsibility</td>
<td>Christoph Siegfried Herrmann</td>
</tr>
<tr>
<td>Module counseling</td>
<td>Daniel Strüber</td>
</tr>
<tr>
<td>Entry requirements</td>
<td>Enrolment in Master's programme Neurocognitive Psychology.</td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>Goals of module:</td>
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<tr>
<td></td>
<td>Students will acquire specific knowledge about the presentation of scientific results both orally and in writing. Students will learn modern techniques for presentation, literature research and writing skills. They will also be taught about arguing scientifically.</td>
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<td></td>
<td>Competencies:</td>
</tr>
<tr>
<td></td>
<td>++ data presentation &amp; discussion</td>
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<tr>
<td></td>
<td>++ scientific literature</td>
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<td></td>
<td>++ scientific English / writing</td>
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<td></td>
<td>++ scientific communication skills</td>
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<td></td>
<td>+ group work</td>
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<tr>
<td>Module contents</td>
<td></td>
</tr>
<tr>
<td>Part 1: Communication of scientific results (seminar)</td>
<td></td>
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<tr>
<td></td>
<td>• Literature search</td>
</tr>
<tr>
<td></td>
<td>• Presentation skills</td>
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<td></td>
<td>• Writing skills</td>
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<tr>
<td>Part 2: Psychological colloquium</td>
<td>Experienced scientists from various psychological disciplines will be giving talks about their experimental results. Speakers will be invited also from other universities. Students are encouraged to discuss the results with the experts and to make suggestions on whom to invite.</td>
</tr>
<tr>
<td>Links</td>
<td></td>
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<tr>
<td>Language of instruction</td>
<td>English</td>
</tr>
<tr>
<td>Duration (semesters)</td>
<td>1-2 Semester</td>
</tr>
<tr>
<td>Module frequency</td>
<td>Part 1 will be offered every winter term. Part 2 will be offered every semester.</td>
</tr>
<tr>
<td>Module capacity</td>
<td>unlimited</td>
</tr>
<tr>
<td>Reference text</td>
<td>Students can chose whether they want to attend the colloquium in the first, second or both semesters. If you want to earn the bonus, you need to use the official bonus sheet to prove your attendance which will be handed to you in the beginning of the winter term.</td>
</tr>
<tr>
<td>Modulelevel</td>
<td>MM (Mastermodul / Master module)</td>
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<tr>
<td>Modulart</td>
<td>Pflicht / Mandatory</td>
</tr>
<tr>
<td>Lern-/Lehrform / Type of program</td>
<td>Communication of scientific results: seminar; Psychological colloquium: colloquium</td>
</tr>
<tr>
<td>Vorkenntnisse / Previous knowledge</td>
<td></td>
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<tr>
<td>Examination</td>
<td></td>
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<tr>
<td>Time of examination</td>
<td></td>
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<tr>
<td>Type of examination</td>
<td></td>
</tr>
<tr>
<td>Final exam of module</td>
<td>during winter term</td>
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<tr>
<td>The module requires an oral presentation that will be evaluated. Bonus for active participation (contribution to discussion, e.g. questions or comments) during the colloquium and attendance of at least 8 colloquium sessions.</td>
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<tr>
<td>Course type</td>
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<tr>
<td>Comment</td>
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<tr>
<td>SWS</td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td></td>
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<tr>
<td>Workload attendance</td>
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</tr>
<tr>
<td>Seminar</td>
<td>2.00</td>
</tr>
<tr>
<td>WISE</td>
<td>28 h</td>
</tr>
<tr>
<td>Course type</td>
<td>Comment</td>
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<td>-------------</td>
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</tr>
<tr>
<td>Colloquium</td>
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**Total time of attendance for the module**

56 h
**psy140 - Minor**

<table>
<thead>
<tr>
<th><strong>Module label</strong></th>
<th>Minor</th>
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<tbody>
<tr>
<td><strong>Module code</strong></td>
<td>psy140</td>
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<tr>
<td><strong>Credit points</strong></td>
<td>9.0 KP</td>
</tr>
<tr>
<td><strong>Workload</strong></td>
<td>270 h</td>
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**Used in course of study**
- Master Neurocognitive Psychology > Mastermodule

**Contact person**
- Module counseling
  - Kerstin Bleichner
  - Jochem Rieger

**Entry requirements**
Enrolment in Master's programme Neurocognitive Psychology.

**Skills to be acquired in this module**

**Goals of module:**
Students will gain an overview of non-psychological topics related to cognitive neuroscience and neuropsychology. They will see how psychological theories apply in other fields. Students can strengthen their own professional profile.

**Competencies**

++ interdisciplinary knowledge & thinking

**Module contents**
Students can take Master modules and courses from the fields

- Biology
- Neurosciences
- Computer Science
- Physics
- Mathematics
- Pedagogy
- Philosophy
- related fields

The content of the courses/modules taken as Minor needs to be clearly different from the contents of the Neurocognitive Psychology modules.

A list of approved courses/modules can be found on our website.

Upon approval, German-speaking students can attend a career-relevant language course (i.e. necessary for internship, practical project or Master's thesis; maximum of 6 CP for this module).

Students whose first language is not German, may take German classes.

We recommend taking modules/courses that strengthen your own professional profile.

**Reader's advisory**

**Links**
List of approved courses/modules and approval form: http://uol.de/en/psychology/study-programme/master/course-overview/

**Languages of instruction**
English, German

**Duration (semesters)**
1 Semester

**Module frequency**
irregular

**Module capacity**
unlimited

**Reference text**
PLEASE NOTE:
- If you want to take a module/course which is not listed in the list of approved courses/modules, please request approval BEFORE you start the course/module (list of approved courses/modules and approval form can be found on our website)
- Bachelor courses/modules that are also offered in Master of Education programmes are NOT acceptable! (Please check in StudIP)
- It is your responsibility to ask the teacher whether you can take part.

**Modulelevel**
MM (Mastermodul / Master module)

**Modulart**
Pflicht / Mandatory

**Lern-Lehrform / Type of program**
Lectures and seminars (depends on the chosen modules)

**Vorkenntnisse / Previous knowledge**

<table>
<thead>
<tr>
<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final exam of module</td>
<td></td>
<td>If grades are earned in the minor, those are counted as pass/fail. Certificates for grades can be separately requested from the examination office.</td>
</tr>
<tr>
<td>Course type</td>
<td>Course or seminar</td>
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<td></td>
<td>(Please refer to the module description for information on the courses you can have counted towards psy140 Minor.)</td>
<td></td>
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<tr>
<td>SWS</td>
<td>0.00</td>
<td></td>
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<tr>
<td>Frequency</td>
<td>SuSe and WiSe</td>
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</tr>
<tr>
<td>Workload attendance</td>
<td>0 h (Depends on the chosen course, but at least 14 hours attendance.)</td>
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</table>
psy150 - Clinical Psychology

Module label: Clinical Psychology
Module code: psy150
Credit points: 9.0 KP
Workload: 270 h
Used in course of study: Master Neurocognitive Psychology > Mastermodule
Contact person: Module responsibility
  Christiane Margarete Thiel
Entry requirements: Enrolment in Master's programme Neurocognitive Psychology.

Skills to be acquired in this module
Goals of the Module:
Students acquire scientifically sound, critical thinking regarding the genesis and psychopharmacological treatment of various mental illnesses; decision making based on the medical guidelines and evidence-based practice.

Competencies:
++ Neuropsychological / neurophysiological knowledge
+ experimental methods
+ data presentation & discussion
+ scientific literature
+ critical & analytical thinking
+ knowledge transfer

Module contents
The first part of the module provides students with a theoretical and practical background on neurobiological and neurochemical bases of psychiatric disorders and pharmacological interventions. This will be complemented by psychiatric interviews in simulated patients focussing on psychopathological assessment. In the second part, the students will learn to plan and assess the effectiveness of psychological interventions for selected disorders.

Part 1: Neurobiological basis of psychiatric disorders and pharmacological intervention (lecture and seminar)
- Basics of neurotransmitter systems and psychopharmacology
- Substance Abuse (e.g. psychostimulants, hallucinogens)
- Depression
- Anxiety Disorders
- Alzheimer's Disease
- Schizophrenia
- psychopathological assessment

Part 2: Psychological interventions within the framework of evidence-based medicine (seminar)
- (partly in German): Concepts of evidence based treatment and treatment of acquired dysfunctions of the brain
- Treatment of ADHD

Reader's advisory
- Selected papers (part 2)

Links
Languages of instruction: English, German
Duration (semesters): 2 Semester
Module frequency: Part 1 will be offered every winter term, part 2 every summer term.
Module capacity: unlimited
Module level: MM (Mastermodul / Master module)
Lern-/Lehrform / Type of program: Part 1: lecture and seminar; part 2: seminar
## Vorkenntnisse / Previous knowledge

<table>
<thead>
<tr>
<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final exam of module</td>
<td>in the term holiday (usually March)</td>
<td>The module will be tested with a written exam (2 h) on the contents of part 1. Bonus for a presentation and participation in discussions or group work in other parts of the module (the bonus must be achieved in all other classes/events).</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td></td>
<td>2.00</td>
<td>WiSe</td>
<td>28 h</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td>4.00</td>
<td>SuSe and WiSe</td>
<td>56 h</td>
</tr>
</tbody>
</table>

**Total time of attendance for the module** 84 h
psy170 - Neurophysiology

Module label: Neurophysiology
Module code: psy170
Credit points: 6.0 KP
Workload: 180 h
Used in course of study: Master Neurocognitive Psychology > Mastermodule
Contact person: Stefan Debener

Entry requirements: Enrolment in Master's programme Neurocognitive Psychology.

Skills to be acquired in this module:

Goals of module: Students will understand the basic concepts of biomedical signal processing. They will use EEG analysis tools interactively and independently and will understand the complete chain of EEG analysis steps, from data import to the illustration of results. They will be able to use open source tools for EEG analysis and apply theoretical knowledge to practical problems of physiology.

Competencies:
++ Neuropsychological / neurophysiological knowledge
++ experimental methods
++ statistics & scientific programming
++ ethics / good scientific practice / professional behavior
+ group work
+ project & time management

Module contents:

Students will acquire specific knowledge about neurophysiology and neuroanatomy, learn the fundamental concepts of multi-channel EEG analysis, and acquire hands-on skills in using EEGLAB, an open-source software toolbox for advanced EEG analysis.

Part 1: Neurophysiology and neuroanatomy (lecture)

- Neurophysiology, EEG, EMG, ECG
- Neuroanatomy
- Time-domain and frequency-domain analysis methods

Part 2: EEG recording and analysis (theoretical-practical seminar)

- Recording and analysis of biomedical signals
- Averaging, filtering, signal-to-noise
- Topographical EEG analysis

Part 3: EEG analysis with Matlab (theoretical-practical seminar)

- EEGLAB file I/O, data structure and scripting
- Preprocessing, artefact rejection and artefact correction
- Statistical decomposition
- Event-related potentials, topographical mapping and power spectra
- Illustration of results

Reader's advisory:


Links

Language of instruction: English
Duration (semesters): 2 Semester
Module frequency: The module will be offered every winter term.
Module capacity: 18 (The lecture is not restricted.)

Reference text: PLEASE NOTE:
We strongly recommend to take either psy170, psy270, psy275, psy280, or psy220 to gain methodological competencies (EEG, fMRI, TBS, HCI) that are needed for most practical projects and Master's theses!

<table>
<thead>
<tr>
<th>Modullvel</th>
<th>MM (Mastermodul / Master module)</th>
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<tbody>
<tr>
<td>Modult</td>
<td>Wahlpflicht / Elective</td>
</tr>
<tr>
<td>Lern-/Lehrform / Type of program</td>
<td>Part 1: lecture; Part 2: theoretical-practical seminar; Part 3: theoretical-practical seminar; additional tutorial</td>
</tr>
</tbody>
</table>

**Previous knowledge**

**Examination**

<table>
<thead>
<tr>
<th>Time of examination</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>exam period at the end of the summer term</td>
<td>The module will be tested with a written exam of 2 h duration. Bonus for recording electroencephalographic data.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>2 semester hours per week in first half of the winter term.</td>
<td>1.00</td>
<td>WiSe</td>
<td>14 h</td>
</tr>
<tr>
<td>Theorie-Praxis-Seminare</td>
<td>Originalfassung 2 semester hours per week in second half of the winter term. 2 semester hours per week in summer term.</td>
<td>3.00</td>
<td>SuSe and WiSe</td>
<td>42 h</td>
</tr>
<tr>
<td>Tutorial</td>
<td>2 hours/week</td>
<td>0.00</td>
<td>SuSe</td>
<td>0 h</td>
</tr>
</tbody>
</table>

**Total time of attendance for the module**

| 56 h |
psy181 - Neurocognition

Module label: Neurocognition
Module code: psy181
Credit points: 6.0 KP
Workload: 180 h

Used in course of study: Master Neurocognitive Psychology > Mastermodule

Contact person: Module responsibility
Christiane Margarete Thiel

Entry requirements: Enrolment in Master's programme Neurocognitive Psychology.

Skills to be acquired in this module:
Goals of module:
Students should be able to recognize and critically evaluate the value of considering neuroscience in the study of psychological topics.

Competencies:
++ neuropsychological / neurophysiological knowledge
++ interdisciplinary knowledge & thinking
++ data presentation & discussion
++ scientific literature
+ scientific communication skills
+ group work

Module contents:
Students will first acquire a general understanding of the brain mechanisms of different cognitive functions and the methods used to study these functions. They will then apply this knowledge by discussing current research topics (part 1). General knowledge will be focused on the relation between the development of the human brain and the cognitive processes it supports (part 2).

Part 1: Introduction to cognitive neuroscience (lecture and seminar)
- Brain and cognition, methods of cognitive neuroscience
- Attention, learning and memory
- Emotional and social behaviour
- Language, executive functions

Part 2: Neurocognitive development (seminar)
- Brain development and cortical plasticity
- Effects of early-life stress on brain development
- Development of object recognition, social cognition, memory, and executive functions

Reader's advisory:

Links:
Language of instruction: English
Duration (semesters): 1 Semester
Module frequency: The module will be offered every winter term.
Module capacity: 20 (Part 1 (lecture and seminar) are unrestricted, part 2 is restricted to 20 students.)
Modullevel: MM (Mastermodul / Master module)
Modulart: Wahlpflicht / Elective
Lern-Lehrform / Type of program: Part 1: lecture and seminar; Part 2: seminar
Vorkenntnisse / Previous knowledge: 
Examination Time of examination Type of examination
Final exam of module: in the term holidays (usually March). The module will be tested with a written exam of 2 h duration on the contents of part 1. Bonus for a
<table>
<thead>
<tr>
<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
<th>Presentation and participation in discussions on other presentations in the seminar.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course type</td>
<td>Comment SWS Frequency Workload attendance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lecture</td>
<td>1.00 WiSe 14 h</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seminar</td>
<td>3.00 WiSe 42 h</td>
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<td></td>
</tr>
</tbody>
</table>

**Total time of attendance for the module**: 56 h
### psy190 - Sex and Cognition

<table>
<thead>
<tr>
<th>Module label</th>
<th>Sex and Cognition</th>
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<tbody>
<tr>
<td>Module code</td>
<td>psy190</td>
</tr>
<tr>
<td>Credit points</td>
<td>6.0 KP</td>
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<tr>
<td>Workload</td>
<td>180 h</td>
</tr>
<tr>
<td>Used in course of study</td>
<td>• Master Neurocognitive Psychology &gt; Mastermodule</td>
</tr>
<tr>
<td>Contact person</td>
<td>Module responsibility</td>
</tr>
<tr>
<td></td>
<td>• Daniel Strüber</td>
</tr>
<tr>
<td>Entry requirements</td>
<td>Enrolment in Master's programme Neurocognitive Psychology. Neuroscience students can take part on request.</td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>Goals of module: Students will acquire specific knowledge about sex differences in cognitive abilities and social behaviours. They will be able to understand the interrelated impact of social and biological influences on the brain's control of the (sex-specific) behaviours. Students should be able to critically evaluate behavioural sex differences from different perspectives and to reflect on possible implications for society.</td>
</tr>
<tr>
<td></td>
<td>Competencies:</td>
</tr>
<tr>
<td></td>
<td>• neuropsychological / neurophysiological knowledge</td>
</tr>
<tr>
<td></td>
<td>• interdisciplinary knowledge &amp; thinking</td>
</tr>
<tr>
<td></td>
<td>• data presentation &amp; discussion</td>
</tr>
<tr>
<td></td>
<td>• scientific literature</td>
</tr>
<tr>
<td></td>
<td>• critical &amp; analytical thinking</td>
</tr>
<tr>
<td></td>
<td>• scientific communication skills</td>
</tr>
<tr>
<td></td>
<td>• group work</td>
</tr>
<tr>
<td></td>
<td>• project &amp; time management</td>
</tr>
<tr>
<td>Module contents</td>
<td>Part 1: Introduction to the study of sex differences (lecture)</td>
</tr>
<tr>
<td></td>
<td>• The measurement of sex differences</td>
</tr>
<tr>
<td></td>
<td>• Sex differences in emotion</td>
</tr>
<tr>
<td></td>
<td>• Sex differences in aggression</td>
</tr>
<tr>
<td></td>
<td>• Sex differences in cognitive abilities</td>
</tr>
<tr>
<td></td>
<td>• Hormones, sexual differentiation, and gender identity</td>
</tr>
<tr>
<td></td>
<td>• Sex hormones and play preferences</td>
</tr>
<tr>
<td></td>
<td>• Sex differences in hemispheric organization</td>
</tr>
<tr>
<td></td>
<td>• Brain size and intelligence</td>
</tr>
<tr>
<td></td>
<td>Part 2: Sex, brain, and behaviour (seminar)</td>
</tr>
<tr>
<td></td>
<td>• Sex differences in empathy</td>
</tr>
<tr>
<td></td>
<td>• The extreme male brain theory of autism (S. Baron-Cohen)</td>
</tr>
<tr>
<td></td>
<td>• Sex differences in neuropsychiatric disorders</td>
</tr>
<tr>
<td></td>
<td>• Sex differences in stress response</td>
</tr>
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<td></td>
<td>• Social implications of sex differences</td>
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### Reader's advisory


### Links

<table>
<thead>
<tr>
<th>Language of instruction</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration (semesters)</td>
<td>1 Semester</td>
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<tr>
<td>Module frequency</td>
<td>The module will be offered every summer term.</td>
</tr>
<tr>
<td>Module capacity</td>
<td>30</td>
</tr>
<tr>
<td>Modullevel</td>
<td>MM (Mastermodul / Master module)</td>
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<tr>
<td>Modulart</td>
<td>Wahlpflicht / Elective</td>
</tr>
<tr>
<td>Lern-Lehrform / Type of program</td>
<td>Part 1: lecture; Part 2: seminar</td>
</tr>
<tr>
<td>Vorkenntnisse / Previous knowledge</td>
<td></td>
</tr>
<tr>
<td>Examination</td>
<td>Time of examination</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td><strong>Final exam of module</strong></td>
<td>during summer term</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td></td>
<td>2.00</td>
<td>SuSe</td>
<td>28 h</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td>2.00</td>
<td>SuSe</td>
<td>28 h</td>
</tr>
</tbody>
</table>

**Total time of attendance for the module** 56 h
psy200 - Neuropsychology

Module label  Neuropsychology
Module code   psy200
Credit points 9.0 KP
Workload     270 h
Used in course of study  

- Master Neurocognitive Psychology > Mastermodule

Contact person  

- Module responsibility
  - Stefan Debener

Entry requirements  

- Enrolment in Master's programme Neurocognitive Psychology.

Skills to be acquired in this module  

Goals of module:
Students will learn to understand changes in thinking and behaviour that may arise from brain dysfunctions (part 1, 4), acquire specific knowledge on cognitive rehabilitation (part 2), and learn to understand, communicate and evaluate progress in clinical practice and experimental research in neuropsychology (part 3, 4).

Competencies:
++ neuropsychological / neurophysiological knowledge
+ interdisciplinary knowledge & thinking
++ experimental methods
+ data presentation & discussion
++ scientific literature
+ critical & analytical thinking
+ scientific communication skills

Module contents  

Part 1: Introduction to Clinical Neuropsychology (lecture)
- Cortical lobes (anatomy, functions, lesion symptoms, neuropsychological tests)
- Higher functions (learning & memory, language, emotion, spatial behavior attention)
- Plasticity and disorders (development, learning and reading disabilities, recovery)

Part 2: Cognitive Neurorehabilitation (seminar)
- Behavioural and neuropsychological approaches
- neurofeedback in neurorehabilitation and ADHD
- memory rehabilitation
- effects of physical activity on cognition
- motor recovery

Part 3: Research Colloquium Clinical and Experimental Neuropsychology (colloquium)
- Presentations covering recent advances in the field of Experimental and Clinical Neuropsychology

Part 4: Topics in Clinical Neuropsychology (seminar; taught partly in German)
- Clinical neuroanatomy
- Neurodegenerative diseases
- Dementia

Reader’s advisory

Links

Languages of instruction  

- English
- German

Duration (semesters)  

- 2-3 Semester

Module frequency  

- The module will be offered every winter term.

Module capacity  

- 30 (Part 4 is not restricted.)

Reference text  

- 3 CP for each module part, choose 3 out of 4 parts! Part 1 (lecture) is mandatory.

If you want to earn the bonus, you need to use the official bonus sheet to prove your attendance which will be handed to you in the beginning of the winter term.

Module level  

- MM (Mastermodule / Master module)
<table>
<thead>
<tr>
<th>Modulart</th>
<th>Wahlpflicht / Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lern-/Lehrform / Type of program</td>
<td>Part 1: lecture; Part 2: seminar; Part 3: colloquium; Part 4: seminar</td>
</tr>
<tr>
<td>Vorkenntnisse / Previous knowledge</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final exam of module</td>
<td>exam period at the end of winter term</td>
<td>The module will be tested with a written exam of 2 h duration. Bonus for a presentation and participation in discussions on other presentations and attendance of at least 70% in the seminars and colloquium.</td>
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<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
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<tbody>
<tr>
<td>Lecture</td>
<td></td>
<td>2.00</td>
<td>WiSe</td>
<td>28 h</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td>4.00</td>
<td>SuSe and WiSe</td>
<td>56 h</td>
</tr>
<tr>
<td>Colloquium</td>
<td></td>
<td>2.00</td>
<td>SuSe</td>
<td>28 h</td>
</tr>
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</table>

Total time of attendance for the module 112 h
psy210 - Applied Cognitive Psychology

Module label: Applied Cognitive Psychology  
Module code: psy210  
Credit points: 6.0 KP  
Workload: 180 h  
Used in course of study: Master Neurocognitive Psychology > Mastermodule  
Contact person: Module responsibility  
  » Jochem Rieger  
Entry requirements: Enrolment in Master's programme Neurocognitive Psychology. Neuroscience students can take part on request.  
Skills to be acquired in this module:  
Goals of the module: The module aims to provide an overview of theories of (Neuro)Cognitive Psychology with potential for application. It will cover core concepts of cognitive psychology, their neuronal basis, basic knowledge of neuroimaging and data analysis techniques. Special emphasis will be put on research aiming at complex real-world settings and translation of basic science in to practice. Examples of successful transfers will be analyzed. Parts 1 (lecture) and 2 (seminar) will run in parallel. The lecture provides the theoretical basis. In the seminar the material is consolidated by examples from the literature will be presented and critically analyzed and discussed.  
Competencies: On completion of this module students should have a repertoire of cognitive psychology concepts relevant for real world situations, be able to transfer the learned theoretical concepts into practical contexts and evaluate potential issues arising in the process of translation.  
  » Neuropsychological / neurophysiological knowledge  
  » interdisciplinary knowledge & thinking  
  » experimental methods  
  » scientific literature  
  » ethics / good scientific practice / professional behavior  
  » critical & analytical thinking  
  » scientific communication skills  
  » knowledge transfer  
Module contents: Part 1: (Neuro)Cognitive Psychology in the wild I (lecture)  
  • Neurocognitive Psychology with emphasis in real world context  
  • Methodological considerations: Generalization, validity of theories and research methods  
  • Information uptake and representation: Sensation, perception, categorization  
  • Selection of information and capacity: Attention and memory enhancement and failure  
  • Generation and communication: Language, reading, dyslexia  
  • Pursuing goals: Thinking, problem solving and acting  
Part 2: (Neuro)Cognitive Psychology in the wild II (seminar)  
  • In the accompanying seminar we will work through recent examples in the literature for topics of the lecture. The goal is to apply novel knowledge from the lecture to understand and critically discuss actual research approaches.  
Reader’s advisory:  
Links:  
Language of instruction: English  
Duration (semesters): 1 Semester  
Module frequency: Part 1 will be offered every summer term, part 2 every winter term.  
Module capacity: 30  
Modullevel: MM (Mastermodul / Master module)  
Modulart: Wahlpflicht / Elective
**Lern-/Lehrform / Type of program**

Part 1: 1 lecture (2 SWS),
Part 2: 1 seminar (2 SWS).

**Vorkenntnisse / Previous knowledge**

**Examination**

<table>
<thead>
<tr>
<th>Time of examination</th>
<th>Type of examination</th>
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<tbody>
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</tbody>
</table>

**Final exam of module**

- The module will be evaluated with a written exam of 2 h duration.
- Bonus for a presentation and participation in discussions on other presentations in the seminar

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td></td>
<td>2.00</td>
<td>SuSe</td>
<td>28 h</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td>2.00</td>
<td>WiSe</td>
<td>28 h</td>
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</table>

**Total time of attendance for the module**

56 h
psy220 - Human Computer Interaction

Module label: Human Computer Interaction
Module code: psy220
Credit points: 6.0 KP
Workload: 180 h
Used in course of study: Master Neurocognitive Psychology > Mastermodule
Contact person: Module responsibility
  - Jochem Rieger

Entry requirements:

Skills to be acquired in this module:

Goals of module:
The goal of the module is to provide students with basic skills required to plan, implement and evaluate devices for human computer interaction. As a specific goal the module works toward the implementation of a brain computer interface (BCI). BCIs are ideal showcases as they fully span the interdisciplinary field of HCI design, implementation and evaluation.

Competencies:
++ Neuropsychological / neurophysiological knowledge
++ interdisciplinary knowledge & thinking
+ experimental methods
++ statistics & scientific programming
+ critical & analytical thinking
+ scientific communication skills
+ knowledge transfer
+ group work
+ project & time management

Module contents:

In this module we will address human computer interaction (HCI) in its interdisciplinary requirements focusing on the perspective from neurocognitive psychology. The students learn core concepts in Human Computer Interaction plus data recording and analysis techniques related to Brain Machine Interfacing.

Part 1: Foundations of HCI and BCI (lecture)

- Human information processing and models of human cognition (Perception, attention, memory, emotion and individual differences)
- Computer interfaces for interaction
- Data analysis techniques for brain machine interfacing (time series analysis, feature selection, classification)
- Evaluation techniques

Part 2: HCI and BCI in practice (practical course)
The second part of the module builds upon the theoretical concepts elaborated in the first. We will work through recent applications published in the literature and, where applicable, implement parts of a BCI-system and conduct experiments.

Reader's advisory:

- Additional literature and material will be provided on the course website.

Links:

Language of instruction: English
Duration (semesters): 2 Semester
Module frequency: The module will be offered every summer term.
Module capacity: 15
Reference text: We strongly recommend to take either psy170, psy270, psy275, psy280, or psy220 to gain methodological competencies (EEG, fMRI, TBS, HCI) that are needed for most practical projects and Master's theses!
Modulelevel: MM (Mastermodul / Master module)
Modulart: Wahlpflicht / Elective
Lern-/Lehrform / Type of program: Part 1: lecture; Part 2: practical course
Vorkenntnisse / Previous knowledge:

Examination: Time of examination: Type of examination
Examination | Time of examination | Type of examination
--- | --- | ---
Final exam of module | last lecture in summer term | The module will be evaluated with an oral exam (20 min). Bonus for a presentation and participation in discussions on other presentations in the seminar.

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
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<tbody>
<tr>
<td>Lecture</td>
<td></td>
<td>2.00</td>
<td>SuSe</td>
<td>28 h</td>
</tr>
<tr>
<td>Theorie-Praxis-Seminare</td>
<td></td>
<td>2.00</td>
<td>SuSe</td>
<td>28 h</td>
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</table>

**Total time of attendance for the module**: 56 h
**psy230 - Neuromodulation of Cognition**

<table>
<thead>
<tr>
<th>Module label</th>
<th>Neuromodulation of Cognition</th>
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</thead>
<tbody>
<tr>
<td>Module code</td>
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<tr>
<td>Credit points</td>
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<tr>
<td>Workload</td>
<td>180 h</td>
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<tr>
<td>Used in course of study</td>
<td>Master Neurocognitive Psychology &gt; Mastermodule</td>
</tr>
<tr>
<td>Contact person</td>
<td>Module responsibility</td>
</tr>
<tr>
<td></td>
<td>Jochem Rieger</td>
</tr>
<tr>
<td>Entry requirements</td>
<td>Enrolment in Master's programme Neurocognitive Psychology. Neuroscience students can take part on request.</td>
</tr>
</tbody>
</table>

**Skills to be acquired in this module**

**Goals of module:**
The aim of this module is to provide students with a theoretical background on how cognitive functions can be altered via neuromodulation.

**Competencies:**
- Neuropsychological / neurophysiological knowledge
- Interdisciplinary knowledge & thinking
- Experimental methods
- Ethics / good scientific practice / professional behavior
- Critical & analytical thinking
- Scientific communication skills

**Module contents**

Students will be introduced to the concepts of neuromodulation and the application of theoretical knowledge of neurophysiology to the modulation of cognitive functions.

**Part 1: Neuromodulation of cognition (lecture)**

- Neurotransmitter systems of cognition
- Neuropharmacological intervention
- Neuroenhancement
- Neurofeedback
- Neurostimulation

**Part 2: Neurofeedback (seminar)**

- Neurofeedback in control and therapy
- EEG-Neurofeedback
- EMG-Neurofeedback
- Transcranial magnetic stimulation
- Deep brain stimulation
- Patient safety

**Reader's advisory**


**Links**

**Language of instruction**

- English

**Duration (semesters)**

- 1 Semester

**Module frequency**

The module will be offered every winter term.

**Module capacity**

- 15

**Modullevel**

- MM (Mastermodul / Master module)

**Modulart**

- Wahlpflicht / Elective

**Lern-/Lehrform / Type of program**

- Part 1: lecture; Part 2: seminar

**Vorkenntnisse / Previous knowledge**

**Examination**

<table>
<thead>
<tr>
<th>Time of examination</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination</td>
<td>Time of examination</td>
</tr>
<tr>
<td>----------------------</td>
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</tr>
<tr>
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<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>2.00</td>
<td></td>
<td>WiSe</td>
<td>28 h</td>
</tr>
<tr>
<td>Seminar</td>
<td>2.00</td>
<td></td>
<td>WiSe</td>
<td>28 h</td>
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</table>

**Total time of attendance for the module**: 56 h
psy241 - Computation in Neuroscience

<table>
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<tr>
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<th>Computation in Neuroscience</th>
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<tbody>
<tr>
<td>Module code</td>
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</tr>
<tr>
<td>Credit points</td>
<td>6.0 KP</td>
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<td>Workload</td>
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</tr>
<tr>
<td>Used in course of study</td>
<td>• Master Neurocognitive Psychology &gt; Mastermodule</td>
</tr>
</tbody>
</table>

Contact person

Module responsibility

- Johannes Voßkuhl

Entry requirements

Enrolment in Master's programme Neurocognitive Psychology.

Skills to be acquired in this module

Goals of module:

Students will acquire scientific programming skills as well as specific knowledge of computational methods in neuroscience and cognition. They will learn to judge the appropriateness and complexity of computational problems and solutions.

Competencies:

- Neuropsychological / neurophysiological knowledge
- experimental methods
- statistics & scientific programming
- critical & analytical thinking
- knowledge transfer
- group work

Module contents

Part 1: Introduction to scientific programming I (theoretical-practical seminar)

- Basic data types and structures
- Flow control (conditions, loops, errors)
- Testing and debugging
- Functions

Part 2: Introduction to scientific programming II (theoretical-practical seminar)

- Classes and objects
- Parallel processing
- Frequency analysis methods
- EEG processing

Part 3: Scientific programming I (excercise)

- Implementation of examples from part 1

Part 4: Scientific programming II (exercise)

- Implementation of examples from part 2

Reader's advisory

- Mathworks (2009): MATLAB online documentation

Links

Language of instruction | English
Duration (semesters)     | 2 Semester
Module frequency         | The module will be offered every winter term.
Module capacity          | unlimited
Modulelevel              | MM (Mastermodul / Master module)
Modulart                 | Pflicht / Mandatory
Lern-/Lehrform / Type of program | Part 1: theoretical-practical seminar; Part 2: theoretical-practical seminar; Part 3: excercise; Part 4: excercise; additional tutorials
### Vorkenntnisse / Previous knowledge

<table>
<thead>
<tr>
<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Final exam of module</strong></td>
<td>exam period at the end of the summer term</td>
<td>The participants will have to independently develop and program a solution for a given neuroscientific problem. Both the written code as well as the documentation of the approach taken will be assessed. Bonus for regularly handing in a total of 12 programming exercises.</td>
</tr>
</tbody>
</table>

### Course type

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theorie-Praxis-Seminare</td>
<td>2 semester hours per week for winter and summer term</td>
<td>4.00</td>
<td>SuSe and WiSe</td>
<td>56 h</td>
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<tr>
<td>Exercises</td>
<td>1 semester hour per week for winter and summer term</td>
<td>2.00</td>
<td>SuSe and WiSe</td>
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<tr>
<td>Tutorial</td>
<td>2 semester hours per week in winter and summer term</td>
<td>0.00</td>
<td>SuSe and WiSe</td>
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**Total time of attendance for the module** 84 h
### psy250 - Internship

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>Module code</td>
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<tr>
<td>Credit points</td>
<td>15.0 KP</td>
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<td>Workload</td>
<td>450 h</td>
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<td>• Master Neurocognitive Psychology &gt; Mastermodule</td>
</tr>
<tr>
<td>Contact person</td>
<td>Module responsibility</td>
</tr>
<tr>
<td></td>
<td>• Cornelia Kranczioch-Debener</td>
</tr>
<tr>
<td>Entry requirements</td>
<td>Enrolment in Master's programme Neurocognitive Psychology.</td>
</tr>
</tbody>
</table>

#### Skills to be acquired in this module

**Goals of module:** Students will obtain direct experience in the field of psychology. This includes being involved in the provision of psychological or neuropsychological services in real-life situations, such as neuropsychological testing or counselling in a hospital or mental health clinic, or conducting and contributing to psychological research. The internship should be chosen by the student such that it can provide a meaningful educational opportunity that will help students to decide on their preferred area of work.

**Competencies:**
- ++ expert neuropsychological/neurophysiological knowledge
- + interdisciplinary knowledge & thinking
- + experimental methods
- ++ ethics / good scientific practice / professional behavior
- ++ knowledge transfer
- + project & time management

#### Module contents

The student will work in a field of psychology of personal choice. The student will get to know and participate in the daily work routines of a psychologist.

#### Reader's advisory

**Links**

**Languages of instruction**
English, German

**Duration (semesters)**
1 Semester

**Module frequency**
irregular

**Module capacity**
unlimited

**Reference text**
The internship lasts 450 hours (12 weeks). It can be performed at 2 different institutions with a minimum duration of 150 hours (4 weeks) for each part. Your supervisor must be a psychologist.

Please note that details are regulated in the exam regulations. A blank internship certificate can be found on the programme website.

**Modullevel**
MM (Mastermodul / Master module)

**Modulart**
Pflicht / Mandatory

**Lern-/Lehrform / Type of program**
internship at (external) institution

**Vorkenntnisse / Previous knowledge**

<table>
<thead>
<tr>
<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final exam of module</td>
<td>Individual; 2-3 possibilities per semester to present the internship to other students</td>
<td>The students have to hand in a written report (2-3 pages) and give a short presentation about their internship. They have to show a certificate from the institution at which they performed the internship. The internship is evaluated as pass/fail.</td>
</tr>
</tbody>
</table>

**Course type**
Practical

**SWS**
0.00

**Frequency**
SuSe and WiSe

**Workload attendance**
0 h (450 h attendance at internship institution)
psy260 - Practical project

Module label | Practical project
Module code | psy260
Credit points | 9.0 KP
Workload | 270 h (attendance in the lab as necessary for your project (~ 200h))
Used in course of study | • Master Neurocognitive Psychology > Mastermodule
Contact person
Module responsibility
» Jochem Rieger
» Christoph Siegfried Hermann
» Stefan Debener
» Jalenur Özyurt
» Andrea Hildebrandt
Module counseling
» Riklef Weerda
Entry requirements
Enrolment in Master's programme Neurocognitive Psychology.

Students who start their practical projects in the summer term 2019 or later: You can only start the practical project if you have passed the exam of psy241 Computation in Neuroscience!

Students who start their practical project in the winter term 2018/19: You will only receive credits for the practical project once you have passed your psy241 exam!

Priority is given to students with experience in methods used in the respective lab or students who have taken the respective teaching modules.

Skills to be acquired in this module
Goals of module:
Students will learn to plan, perform and analyse a study in the field of neurocognition. They will need to apply statistical knowledge and programming competencies to the data acquisition and analysis of data. Results will be related to the current neurocognitive literature and presented in a student poster symposium at the end of the module. Additionally, students should gain experience as participants in studies.

Competencies:
++ experimental methods
+ statistics & scientific programming
++ data presentation & discussion
+ independent research
+ scientific literature
+ ethics / good scientific practice / professional behavior
+ scientific communication skills
+ knowledge transfer
+ group work
++ project & time management

Module contents
• The students develop an empirical investigation, carry it out and analyse the results.
• The students present and discuss their project in respect to recent literature in regular meetings and in a poster symposium.
• Students can develop an experimental design for a follow-up study which could potentially be the topic of their Master's thesis.
• As part of the practical project, students should participate in studies of other practical projects!

Reader's advisory
Links | http://uol.de/en/psychology/study-programme/master/course-overview/
Language of instruction | English
Duration (semesters) | 1 Semester
Module frequency | The module will be offered every winter term.
Module capacity | unlimited
Reference text
Topics for projects will be presented in a colloquium at the end of the summer term.

Students can chose to perform the practical work in either of the research groups of the Department of Psychology. External projects are possible upon approval (information and approval form can be found on the programme website).
<table>
<thead>
<tr>
<th>Modullevel</th>
<th>MM (Mastermodul / Master module)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modulart</td>
<td>Pflicht / Mandatory</td>
</tr>
<tr>
<td>Lern-/Lehrform / Type of program</td>
<td>practical work and regular seminar meetings in the group where the project is performed</td>
</tr>
<tr>
<td>Vorkenntnisse / Previous knowledge</td>
<td>PLEASE NOTE:</td>
</tr>
</tbody>
</table>

Many projects require knowledge of either EEG, fMRI, TBS, or HCI analysis! We strongly recommend to take either psy170: Neurophysiology, psy270/275: fMRI Data Analysis, psy280: Transcranial Brain Stimulation, or psy220 Human Computer Interaction prior to the practical project.

It is expected that students show basic knowledge of Matlab programming before starting the practical project.

<table>
<thead>
<tr>
<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final exam of module</td>
<td>usually end of April</td>
<td>Poster presentation in a student symposium (30% of the grade) and daily project work (70% of the grade).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar</td>
<td>Please select the group in which you perform your practical project.</td>
<td>2.00</td>
<td>WiSe</td>
<td>28 h</td>
</tr>
<tr>
<td>Practical</td>
<td>attendance as necessary for your project (~ 200h)</td>
<td>0.00</td>
<td>WiSe</td>
<td>0 h</td>
</tr>
</tbody>
</table>

**Total time of attendance for the module** 28 h
psy270 - Functional MRI Data Analysis

Module label: Functional MRI Data Analysis
Module code: psy270
Credit points: 9.0 KP
Workload: 270 h

Used in course of study:
- Master Neurocognitive Psychology > Mastermodule

Contact person:
- Module responsibility
  - Carsten Gießing

Entry requirements:
Enrolment in Master's programme Neurocognitive Psychology.

Skills to be acquired in this module:
Goals of module:
Students will learn the basics about planning and performing a neuroimaging study. They will focus on the statistical and methodological background of functional neuroimaging data analysis and analyse a sample functional MRI data set.

Competencies:
++ experimental methods
++ statistics & scientific programming
+ data presentation & discussion
++ group work

Module contents:
Part 1: Functional MRI data analysis (lecture)
Part 2: Planning, performance and analysis of functional neuroimaging studies using MATLAB-based software (seminar)
Part 3: Hands-on fMRI data analysis with SPM (practical course)

Reader's advisory:

Links:
- Language of instruction: English
- Duration (semesters): 1 Semester
- Module frequency: The module will be offered every summer term.
- Module capacity: 15
- The remaining places are reserved for Biology and Neuroscience students.

Reference text:
Since the module is primarily offered for the Master's programme Biology it has to be offered as a blocked course. Please contact us if you are interested in the module but have problems with interfering other courses.

PLEASE NOTE:
We strongly recommend to take either psy170, psy270, psy275, psy280, or psy220 to gain methodological competencies (EEG, fMRI, TBS, HCI) that are needed for most practical projects and Master's theses!

Modulelevel: MM (Mastermodul / Master module)
Modulart: Wahlpflicht / Elective

Lern-/Lehrform / Type of program:
- Part 1: lecture; Part 2: seminar; Part 3: practical course

Vorkenntnisse / Previous knowledge:

Examination:
- Final exam of module: end of summer term
- Oral or written examination Bonus for active participation (e.g. presentations, creating study material for other participants, tandem learning or oral contributions)

Course type:
- Lecture: 2.00
  - Comment: SuSe
  - SWS: 28 h
<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical</td>
<td></td>
<td>4.00</td>
<td>SuSe</td>
<td>56 h</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td>1.00</td>
<td>SuSe</td>
<td>14 h</td>
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</tbody>
</table>

**Total time of attendance for the module**  
98 h
## psy275 - Essentials of fMRI Data Analysis with SPM and FSL

<table>
<thead>
<tr>
<th>Module label</th>
<th>Essentials of fMRI Data Analysis with SPM and FSL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>psy275</td>
</tr>
<tr>
<td>Credit points</td>
<td>6.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>180 h</td>
</tr>
<tr>
<td>(Attendance: 56 h. (4 SWS), reading and practising: 124 h., total: 180 h.)</td>
<td></td>
</tr>
<tr>
<td>Used in course of study</td>
<td>• Master Neurocognitive Psychology &gt; Mastermodule</td>
</tr>
<tr>
<td>Contact person</td>
<td>Riklef Weerda</td>
</tr>
<tr>
<td></td>
<td>Peter Sörös</td>
</tr>
<tr>
<td>Entry requirements</td>
<td>Enrolment in Master's programme Neurocognitive Psychology, 3rd semester or higher.</td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>+ Neuropsychological / neurophysiological knowledge</td>
</tr>
<tr>
<td></td>
<td>+ interdisciplinary knowledge &amp; thinking</td>
</tr>
<tr>
<td></td>
<td>++ experimental methods</td>
</tr>
<tr>
<td></td>
<td>++ statistics &amp; scientific programming</td>
</tr>
<tr>
<td></td>
<td>+ data presentation &amp; discussion</td>
</tr>
<tr>
<td></td>
<td>+ independent research</td>
</tr>
<tr>
<td></td>
<td>+ scientific literature</td>
</tr>
<tr>
<td></td>
<td>+ ethics / good scientific practice / professional behaviour</td>
</tr>
<tr>
<td></td>
<td>+ critical &amp; analytical thinking</td>
</tr>
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<td></td>
<td>+ group work</td>
</tr>
</tbody>
</table>

This module offers a concise introduction to the basic principles of functional magnetic resonance imaging (fMRI). Students will gain essential knowledge about experimental design, data collection and analysis. Special emphasis will be laid on the statistical background of fMRI data analysis and a hands-on introduction to SPM and FSL, two widely-used and free software packages for fMRI data analysis and results visualisation.

### Module contents
1. Methodological basics of functional magnetic resonance imaging (fMRI)
2. Basic principles of fMRI experimental design and data collection
3. Statistical background of fMRI data analysis
4. Hands-on training in fMRI data analysis and results visualisation with SPM and FSL

### Reader's advisory

### Links
- Language of instruction: English
- Duration (semesters): 1 Semester
- Module frequency: The module will be offered in the winter term, blocked in the first half (seven weeks).
- Module capacity: 20
- Reference text: PLEASE NOTE:
  We strongly recommend to take either psy170, psy270, psy275, psy280, or psy220 to gain methodological competencies (EEG, fMRI, TBS, HCI) that are needed for most practical projects and Master's theses!
- Modullevel: MM (Mastermodul / Master module)
- Modulart: Wahlpflicht / Elective
- Lern-/Lehrform / Type of program:
  - Part 1: 1 seminar (1 SWS)
  - Part 2: 1 supervised exercise (3 SWS)

### Vorkenntnisse / Previous knowledge

<table>
<thead>
<tr>
<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final exam of module</td>
<td>end of winter term</td>
<td>written exam</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar</td>
<td></td>
<td>1.00</td>
<td>WiSe</td>
<td>14 h</td>
</tr>
<tr>
<td>Exercises</td>
<td></td>
<td>3.00</td>
<td>WiSe</td>
<td>42 h</td>
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</table>

### Total time of attendance for the module: 56 h
psy280 - Transcranial Brain Stimulation

Module label | Transcranial Brain Stimulation
Module code | psy280
Credit points | 6.0 KP
Workload | 180 h
Used in course of study | • Master Neurocognitive Psychology > Mastermodule

Contact person
Module responsibility
• Christoph Siegfried Herrmann

Entry requirements
Enrolment in Master’s programme Neurocognitive Psychology.

Skills to be acquired in this module
Goals of module:
Students will gain theoretical and practical knowledge on various non-invasive brain stimulation techniques.

Competencies:
++ Neuropsychological / neurophysiological knowledge
++ experimental methods
+ statistics & scientific programming
+ scientific literature
+ ethics / good scientific practice / professional behaviour

Module contents
In this module, we will introduce the theoretical concepts, neurophysiological underpinnings and neurocognitive as well as clinical applications of various non-invasive brain stimulation techniques such as transcranial magnetic stimulation (TMS), transcranial direct current stimulation (tDCS), transcranial alternating current stimulation (tACS), and transcranial random noise stimulation (tRNS). A focus will be tACS, because it is especially suited to modulate brain oscillations which have been shown to correlate with cognitive processes.

Part 1: Introduction to transcranial brain stimulation (lecture)

• Historical overview of brain stimulation
• Different techniques (TMS, IDCS, TACS, fRNS)
• Physiological mechanisms (entrainment, after-effects etc.)
• The use of transcranial brain stimulation in cognitive neuroscience - Experimental parameters (intensity, electrode montage, etc.)
• Pros and cons of TMS vs. tACS
• Technical aspects (artefact correction, modelling current flow, etc.)
• Safety issues
• Ethical considerations of brain stimulation

Part 2: Effects of tACS on physiology and cognition (seminar)

• Physiology of tACS (on-line and after-effects)
• Modulating cognitive functions (e.g. memory, attention, and perception)
• Clinical applications of tACS
• Hands-on experience in the lab

Reader's advisory

Links
Language of instruction | English
Duration (semesters) | 1 Semester
Module frequency | The module will be offered every summer term.
Module capacity | 10
Reference text | We strongly recommend to take either psy170, psy270, psy275, psy280, or psy220 to gain methodological competencies (EEG, fMRI, TBS, HCI) that are needed for most practical projects and Master’s thesis!
Modullevel | MM (Mastermodul / Master module)
Modulart | Wahlpflicht / Elective
Lern-/Lehrform / Type of program | Part 1: lecture; Part 2: seminar
### Vorkenntnisse / Previous knowledge

<table>
<thead>
<tr>
<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final exam of module</td>
<td>during summer term</td>
<td>Oral presentation in the seminar.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td></td>
<td>2.00</td>
<td>SuSe</td>
<td>28 h</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td>2.00</td>
<td>SuSe</td>
<td>28 h</td>
</tr>
</tbody>
</table>

**Total time of attendance for the module**: 56 h
### Abschlussmodul

**mam - Master’s Degree Module**

<table>
<thead>
<tr>
<th>Module label</th>
<th>Master’s Degree Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>mam</td>
</tr>
<tr>
<td>Credit points</td>
<td>30.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>900 h</td>
</tr>
<tr>
<td>(attendance in the lab meetings: 28h (2 SWS); thesis work: 872 hours)</td>
<td></td>
</tr>
<tr>
<td>Used in course of study</td>
<td>• Master Neurocognitive Psychology &gt; Abschlussmodul</td>
</tr>
<tr>
<td>Contact person</td>
<td></td>
</tr>
<tr>
<td>Entry requirements</td>
<td>Enrollment in Master's programme Neurocognitive Psychology. Completion of at least 60 credit points in other modules including module psy241. Assignment of a topic by thesis supervisor and official application with the examination office.</td>
</tr>
</tbody>
</table>

### Skills to be acquired in this module

**Goals of module:**
Students will demonstrate that they are able to perform a psychological experiment according to scientific standards. In addition, they will demonstrate that they are acquainted with the necessary methods and can present their results orally and in written form.

**Competencies:**
- ++ experimental methods
- + statistics & scientific programming
- + data presentation & discussion
- ++ independent research
- + scientific literature
- ++ scientific English / writing
- + ethics / good scientific practice / professional behavior
- + critical & analytical thinking
- + scientific communication skills
- + knowledge transfer
- ++ project & time management

### Module contents

**Part 1: Master's thesis**
The students work on a given topic in cognitive neuroscience using literature research and the appropriate experimental methods.

**Part 2: Master's colloquium**
The preparation of the thesis is accompanied by regular participation in the lab meetings of the groups in which the thesis is performed. Students present their study design at the beginning of their thesis preparation and their results towards the end. In addition, they listen to the presentations of the other lab members and students in the group.

### Reader's advisory

**Rules for external Master's theses are explained here:**
http://uol.de/en/psychology/study-programme/master/course-overview/

**Language of instruction**
English

**Duration (semesters)**
1 Semester

**Module frequency**
irregular

**Module capacity**
unlimited

**Reference text**
If you want to do a Master's thesis outside the Department of Psychology, please follow the rules stated on the program website.

**Modullevel**
Abschlussmodul (Abschlussmodul / Conclude)

**Modulart**
Pflicht / Mandatory

**Lern-/Lehrform / Type of program**
individual thesis preparation with supervision

**Vorkenntnisse / Previous knowledge**
contact your supervisor for details

**Examination**
individual appointments

The written thesis will be evaluated by the supervisor and an additional reviewer (90%). The oral presentation and defence of the thesis results will be evaluated (10%).

**Course type**
Seminar und Projekt

**SWS**
2.00

**Frequency**
SuSe
| Workload attendance        | 28 h  | (Attendance as required for your project and 2 hours per week for participating in the lab meetings.) |