Modules for Neurocognitive Psychology

Mastermodule

psy110 - Research methods

Module label: Research methods
Module code: psy110
Credit points: 12.0 KP
Workload: 360 h

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

Contact person:
- Martin Hecht

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

Skills to be acquired in this module:
Goals of module:
Students will acquire basic knowledge about the planning of an empirical investigation, setting up computer-controlled experiments, multivariate statistical data analysis, and the interpretation, evaluation and synthesis of empirical results.

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)
- Basic concepts of probability, statistical inference, graphical representation of data  
- Linear regression (simple and multiple) and analysis of variance  
- Logistic regression, multivariate t-test

Part 2: Evaluation research (seminar)
- Methods and paradigms of evaluation  
- Multidimensional Scaling and cluster analysis  
- Decision making, meta-analysis

Part 3: Computer-controlled experimentation (seminar)
- Computer hardware basics  
- Scripting and programming in Presentation  
- Combining stimulus delivery with EEG  
- Temporal precision

Part 4: Multivariate Statistics II (lecture)
- Principal component analysis and factor analysis  
- Classification and discrimination  
- Survival analysis  
- Advanced methods (e.g., Bayesian estimation, ICA, machine learning)

Reader's advisory:

Links:
- Language of instruction: English
- Duration (semesters): 2 Semester
- Module frequency: unlimited

Module capacity: unlimited
<table>
<thead>
<tr>
<th>Module level</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>Parts 1 and 4: lectures; Parts 2 and 3: seminars; additional tutorials are offered.</td>
</tr>
<tr>
<td>Vorkenntnisse / Previous knowledge</td>
<td>basic statistics; otherwise please attend Introductory Course Statistics</td>
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<table>
<thead>
<tr>
<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
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<tbody>
<tr>
<td>Final exam of module</td>
<td></td>
<td>The module will be tested with an oral exam (20 min). Bonus for creating a script for the presentation on experimental stimuli in part 3.</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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<tr>
<td>Lecture</td>
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<tr>
<td>Seminar</td>
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<td>WiSe</td>
<td>56 h</td>
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<tr>
<td>Tutorial</td>
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<td>0.00</td>
<td>SuSe and WiSe</td>
<td>0 h</td>
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</table>

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

<table>
<thead>
<tr>
<th>Module label</th>
<th>Psychological diagnostics</th>
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<tr>
<td>Module code</td>
<td>psy120</td>
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<tr>
<td>Credit points</td>
<td>9.0 KP</td>
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<tr>
<td>Workload</td>
<td>270 h</td>
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<td>Used in course of study</td>
<td>Master Neurocognitive Psychology &gt; Mastermodule</td>
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</table>

**Contact person**
- Module responsibility
  - Andreas Hellmann
- Authorized examiners
  - 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 shall be able to utilize the knowledge both within a research context and within an applied context. They will learn to analyse a psychological question in terms of psychological assessment, design and plan the assessment process, select appropriate means, techniques and instruments, apply methods and conduct measurements, analyse and combine gathered information, draw conclusions, write reports and deliver expert opinion, reflect on the assessment process, follow ethical and professional rules.

**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)**
- models and approaches
- methods, processes, guidelines
- theory of testing, approaches to test construction

**Part 2: Psychological Testing (seminar)**
- types of tests
- exercises in testing / practising tests

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

**Reader's advisory**

**Links**
- Language of instruction: English
- Duration (semesters): 2 Semester
- Module frequency: unlimited
- Module level: MM (Mastermodul / Master module)
- Modulart: Pflicht / Mandatory
<table>
<thead>
<tr>
<th>Lern-Lehrform / Type of program</th>
<th>Part 1: 1 lecture; Part 2: 1 seminar; Part 3: 1 seminar</th>
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<tbody>
<tr>
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<tr>
<td>Examination</td>
<td>Time of examination</td>
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<td>Final exam of module</td>
<td>summer term</td>
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<td>Course type</td>
<td>Comment</td>
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<tr>
<td>Lecture</td>
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<tr>
<td>Seminar</td>
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## psy130 - Communication of scientific results

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<tr>
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<tr>
<td>Credit points</td>
<td>6.0 KP</td>
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<tr>
<td>Workload</td>
<td>180 h</td>
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<td>Used in course of study</td>
<td>- Master Neurocognitive Psychology &gt; Mastermodule</td>
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<tr>
<td>Contact person</td>
<td>Module responsibility</td>
</tr>
<tr>
<td></td>
<td>- Christoph Siegfried Herrmann</td>
</tr>
<tr>
<td></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>
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<tr>
<td></td>
<td>++ data presentation &amp; discussion</td>
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<tr>
<td></td>
<td>++ scientific literature</td>
</tr>
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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>Part 1: Communication of scientific results (seminar)</td>
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<tr>
<td></td>
<td>- Literature search</td>
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<tr>
<td></td>
<td>- Presentation skills</td>
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<td></td>
<td>- Writing skills</td>
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<td></td>
<td>Part 2: Psychological colloquium</td>
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<td></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>
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<tr>
<td>Links</td>
<td>English</td>
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<tr>
<td>Duration (semesters)</td>
<td>1-2 Semester</td>
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<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.</td>
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<td>Modulelevel</td>
<td>MM (Mastermodul / Master module)</td>
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<td>Modulart</td>
<td>Pflicht / Mandatory</td>
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<tr>
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<td>Communication of scientific results: seminar; Psychological colloquium: colloquium</td>
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<tr>
<td>Vorkenntnisse / Previous knowledge</td>
<td>Examination Time of examination Type of examination</td>
</tr>
<tr>
<td>Final exam of module</td>
<td>during winter term 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>
<td>Comment SWS Frequency Workload attendance</td>
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<tr>
<td>Seminar</td>
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<td>Colloquium</td>
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<td>Total time of attendance for the module</td>
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### psy140 - Minor

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<tr>
<td>Module code</td>
<td>psy140</td>
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<tr>
<td>Credit points</td>
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<tr>
<td>Workload</td>
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<td>Used in course of study</td>
<td>Master Neurocognitive Psychology &gt; Mastermodule</td>
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<tr>
<td>Contact person</td>
<td></td>
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<tr>
<td>Entry requirements</td>
<td>Enrolment in Master's programme Neurocognitive Psychology.</td>
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</tbody>
</table>

**Skills to be acquired in this module**

**Goals of module:**

Students will gain an overview of non-psychological topics related to cognitive neuroscience. This is intended to enable students to see how psychological theories apply in other fields. Possible modules are listed below. Upon approval German speaking students can attend a career-relevant language course (maximum of 6 CP for this module). Students who's first language is not German, may take German classes.

**Competencies**

++ interdisciplinary knowledge & thinking

**Module contents**

Modules from the following fields can be taken without prior approval:

- Cellular and molecular biology
- Behavioural neurobiology
- Psychophysics and Audiology
- Artificial intelligence and knowledge representation
- Man machine interaction (not in combination with module psy220 Human Computer Interaction)
- Computational neuroscience
- Evolutionary biology
- Rehabilitation pedagogics (taught in German)
- Linear models
- General linear models and semiparametric models
- Philosophy (taught in German)
- German as a foreign language (for non-German students)

**Reader's advisory**

**Links**

**Languages of instruction**

English, German

**Duration (semesters)**

1 Semester

**Module frequency**

unlimited

**Module capacity**

unlimited

**Reference text**

PLEASE NOTE:

- If a course is not listed here, please request approval BEFORE you start the course
- Courses must be at Master's level (except language courses)
- Course descriptions need to state clear pass/fail criteria
- Language courses other than 'German as a foreign language' need to be career-relevant (i.e. necessary for internship, practical project or Master's thesis) and require approval
- Content of the Minor courses need to be clearly different from other taken courses of the study program

**Modullevel**

MM (Mastermodul / Master module)

**Modulart**

Pflicht / Mandatory

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

Lectures and seminars (depends on the chosen modules)

**Vorkenntnisse / Previous knowledge**

**Examination**

Time of examination | Type of examination
--------------------|---------------------
Final exam of module | If grades are earned in the minor, those are counted as pass/fail. Certificates for grades can be separately requested from the examination office.

**Course type**

Course or seminar

**SWS**

0.00
<table>
<thead>
<tr>
<th>Frequency</th>
<th>SuSe and WiSe</th>
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<tr>
<td>Workload attendance</td>
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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 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 and psychotherapeutic interventions. 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)

• Basics of neurotransmitter systems and psychopharmacology
• Substance Abuse (e.g. psychostimulants, hallucinogens)
• Depression
• Anxiety Disorders
• Alzheimer's Disease
• Schizophrenia

Part 1: Psychotherapeutic intervention of selected psychiatric disorders (seminar)

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

• Meyer, J.S., & Gennzer, L.F. (2013) Psychopharmacology: Drugs, the Brain and Behaviour. Sunderland,
  MA: Sinauer Associates. (part 1)
  Sons (12th ed) (introductory literature)
• Selected papers (part 2)

Links
Languages of instruction      English, German
Duration (semesters)          2 Semester
Module frequency              unlimited
Module capacity               MM (Mastermodul / Master module)
Modulart                     Wahlpflicht / Elective
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><strong>Final exam of module</strong></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>
</tr>
</tbody>
</table>

<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>
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<tr>
<td>Seminar</td>
<td></td>
<td>4.00</td>
<td>SuSe and WiSe</td>
<td>56 h</td>
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</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: 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 understand the basic concepts of biomedical signal processing. They will use EEG analysis tools interactively and independently and 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: 24 (The lecture is not restricted.)
Reference text: PLEASE NOTE:
We strongly recommend to take either psy170, psy270, 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>Module level</th>
<th>MM (Mastermodul / Master module)</th>
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<tbody>
<tr>
<td>Modulart</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>
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<table>
<thead>
<tr>
<th>Vorkenntnisse / Previous knowledge</th>
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</thead>
<tbody>
<tr>
<td>Examination</td>
</tr>
<tr>
<td>Final exam of module</td>
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<table>
<thead>
<tr>
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<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
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<tbody>
<tr>
<td>Lecture</td>
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<td>WiSe</td>
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<td>Theorie-Praxis-Seminar</td>
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<td>SuSe and WiSe</td>
<td>42 h</td>
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<td>Tutorial</td>
<td>0.00</td>
<td></td>
<td>SuSe</td>
<td>0 h</td>
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| 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
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>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
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<tbody>
<tr>
<td></td>
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<td>presentation and participation in discussions on other presentations in the seminar.</td>
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<tr>
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<td>Comment</td>
<td>SWS</td>
<td>Frequency</td>
<td>Workload attendance</td>
<td></td>
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</tr>
<tr>
<td>Lecture</td>
<td>1.00</td>
<td>WiSe</td>
<td>14 h</td>
<td></td>
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<tr>
<td>Seminar</td>
<td>3.00</td>
<td>WiSe</td>
<td>42 h</td>
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<tr>
<td><strong>Total time of attendance for the module</strong></td>
<td></td>
<td></td>
<td>56 h</td>
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psy190 - Sex and Cognition

Module label: Sex and Cognition
Module code: psy190
Credit points: 6.0 KP
Workload: 180 h
Used in course of study: Master Neurocognitive Psychology > Mastermodule

Contact person
- Module responsibility
  - Daniel Strüber

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 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.

  Competencies:
  ++ neuropsychological / neurophysiological knowledge
  + interdisciplinary knowledge & thinking
  ++ data presentation & discussion
  ++ scientific literature
  + critical & analytical thinking
  ++ scientific communication skills
  + group work
  + project & time management

Module contents
- Part 1: Introduction to the study of sex differences (lecture)
  - The measurement of sex differences
  - Sex differences in emotion
  - Sex differences in aggression
  - Sex differences in cognitive abilities
  - Hormones, sexual differentiation, and gender identity
  - Sex hormones and play preferences
  - Sex differences in hemispheric organization
  - Brain size and intelligence

- Part 2: Sex, brain, and behaviour (seminar)
  - Sex differences in empathy
  - The extreme male brain theory of autism (S. Baron-Cohen)
  - Sex differences in neuropsychiatric disorders
  - Sex differences in stress response
  - Social implications of sex differences

Reader’s advisory

Links
- Language of instruction: English
- Duration (semesters): 1 Semester
- Module frequency
- Module capacity: 30
- Modulelevel: MM (Mastermodul / Master module)
- Modulart: Wahlpflicht / Elective
- Lern-Lehrform / Type of program: Part 1: lecture; Part 2: seminar
- Vorkenntnisse / Previous knowledge
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<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
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<tr>
<td>Final exam of module</td>
<td>during summer term</td>
<td>The module requires an oral presentation that will be evaluated.</td>
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<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 Neupropsychology
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 multisensory processes (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: Topics in Experimental Neuropsychology (seminar)
• Neural properties of sensory processing in a multiple sensory systems framework
• Human brain studies of multisensory processes
• Cross-modal plasticity

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 (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
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.
Modullevel MM (Mastermodul / Master module)
Modulart Wahlpflicht / Elective
Lern-Lehrform / Type of program Part 1: lecture; Part 2: seminar; Part 3: colloquium; Part 4: seminar
Vorkenntnisse / Previous knowledge
### Examination

<table>
<thead>
<tr>
<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
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</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 part 2 and 3.</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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</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>
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<tr>
<td>Colloquium</td>
<td></td>
<td>2.00</td>
<td>SuSe</td>
<td>28 h</td>
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**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: 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: 30
Module capacity: The module will be offered in summer terms and should be completed within one semester. Both parts will run in parallel.
Modulelevel: MM (Mastermodul / 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: 1 lecture (2 SWS), Part 2: 1 seminar (2 SWS).</td>
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</table>

### Vorkenntnisse / Previous knowledge

**Examination**

<table>
<thead>
<tr>
<th>Time of examination</th>
<th>Type of examination</th>
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</thead>
</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>
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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>Seminar</td>
<td></td>
<td>2.00</td>
<td>SuSe</td>
<td>28 h</td>
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**Total time of attendance for the module** 56 h
### psy220 - Human Computer Interaction

<table>
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<tr>
<th>Module label</th>
<th>Human Computer Interaction</th>
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<tbody>
<tr>
<td>Module code</td>
<td>psy220</td>
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<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>Jochem Rieger</td>
</tr>
</tbody>
</table>

#### 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** | 15  
**Reference text** | We strongly recommend to take either psy170, psy270, psy280, or psy220 to gain methodological competencies (EEG, fMRI, TBS, HCI) that are needed for most practical projects and Master's theses!  
**Module level** | 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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</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>2.00</td>
<td></td>
<td>SuSe</td>
<td>28 h</td>
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<tr>
<td>Theorie-Praxis-Seminare</td>
<td>2.00</td>
<td></td>
<td>WiSe</td>
<td>28 h</td>
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**Total time of attendance for the module** 56 h
**psy230 - Neuromodulation of Cognition**

- **Module label**: Neuromodulation of Cognition
- **Module code**: psy230
- **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 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

### Readers advisory


### Links

- Language of instruction: English
- Duration (semesters): 1 Semester

### Examination

- Time of examination: during winter term
- Type of examination: The module will be evaluated with an oral
<table>
<thead>
<tr>
<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td></td>
<td>presentation in the seminar. Bonus for oral contribution.</td>
<td></td>
<td>2.00</td>
<td>WiSe</td>
<td>28 h</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td></td>
<td></td>
<td>2.00</td>
<td>WiSe</td>
<td>28 h</td>
</tr>
<tr>
<td><strong>Total time of attendance for the module</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>56 h</strong></td>
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</table>
**psy241 - Computation in Neuroscience**

<table>
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<th>Module label</th>
<th>Computation in Neuroscience</th>
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<tr>
<td>Module code</td>
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<tr>
<td>Credit points</td>
<td>6.0 KP</td>
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<tr>
<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 (exercise)**

- 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: unlimited
- Module capacity: unlimited
- Module level: MM (Mastermodul / Master module)
- Modulart: Pflicht / Mandatory
- Lern-Lehrform / Type of program: Part 1: theoretical-practical seminar; Part 2: theoretical-practical seminar; Part 3: exercise; Part 4: exercise; 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>Final exam of module</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>
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</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>Theorie-Praxis-Seminare</td>
<td>4.00</td>
<td>SuSe and WiSe</td>
<td>56 h</td>
<td></td>
</tr>
<tr>
<td>Exercises</td>
<td>2.00</td>
<td>SuSe and WiSe</td>
<td>28 h</td>
<td></td>
</tr>
<tr>
<td>Tutorial</td>
<td>0.00</td>
<td>SuSe and WiSe</td>
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**Total time of attendance for the module** 84 h
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<tbody>
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<td><strong>Module label</strong></td>
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<td><strong>Credit points</strong></td>
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<td><strong>Workload</strong></td>
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<tr>
<td></td>
<td>Master Neurocognitive Psychology &gt; Mastermodule</td>
</tr>
<tr>
<td><strong>Contact person</strong></td>
<td>Module responsibility</td>
</tr>
<tr>
<td></td>
<td>♦ Cornelia Kranczioch-Debener</td>
</tr>
<tr>
<td></td>
<td>♦ Hans Colonius</td>
</tr>
<tr>
<td><strong>Entry requirements</strong></td>
<td>Enrolment in Master's programme Neurocognitive Psychology.</td>
</tr>
<tr>
<td><strong>Skills to be acquired in this module</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Goals of module:</strong></td>
<td>The goal of the internship is to provide students with the opportunity to participate in the daily work of professional psychologists in their job. Students will be able to make informed, career-specific decisions.</td>
</tr>
<tr>
<td><strong>Competencies:</strong></td>
<td>+ experimental methods</td>
</tr>
<tr>
<td></td>
<td>++ ethics / good scientific practice / professional behavior</td>
</tr>
<tr>
<td></td>
<td>++ knowledge transfer</td>
</tr>
<tr>
<td></td>
<td>+ project &amp; time management</td>
</tr>
<tr>
<td><strong>Module contents</strong></td>
<td>The students will work in a field of psychology and get to know the daily work routines of a psychologist.</td>
</tr>
<tr>
<td><strong>Reader's advisory</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Links</strong></td>
<td><a href="http://www.uni-oldenburg.de/en/psychology/study-programme/master/internships/">http://www.uni-oldenburg.de/en/psychology/study-programme/master/internships/</a></td>
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<td><a href="http://www.uni-oldenburg.de/en/psychology/study-programme/master/documents/">http://www.uni-oldenburg.de/en/psychology/study-programme/master/documents/</a></td>
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<tr>
<td><strong>Languages of instruction</strong></td>
<td>English, German</td>
</tr>
<tr>
<td><strong>Duration (semesters)</strong></td>
<td>1 Semester</td>
</tr>
<tr>
<td><strong>Module frequency</strong></td>
<td>unlimited</td>
</tr>
<tr>
<td><strong>Reference text</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Modullevel</strong></td>
<td>MM (Mastermodul / Master module)</td>
</tr>
<tr>
<td><strong>Modulart</strong></td>
<td>Pflicht / Mandatory</td>
</tr>
<tr>
<td><strong>Lern-Lehrform / Type of program</strong></td>
<td>internship at (external) institution</td>
</tr>
<tr>
<td><strong>Vorkenntnisse / Previous knowledge</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Examination</strong></td>
<td>Time of examination</td>
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<tr>
<td><strong>Final exam of module</strong></td>
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<tr>
<td><strong>Course type</strong></td>
<td>Practical</td>
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<td><strong>SWS</strong></td>
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</tr>
<tr>
<td><strong>Frequency</strong></td>
<td>SuSe and WiSe</td>
</tr>
<tr>
<td><strong>Workload attendance</strong></td>
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### psy260 - Practical project

<table>
<thead>
<tr>
<th>Module label</th>
<th>Practical project</th>
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</thead>
<tbody>
<tr>
<td>Module code</td>
<td>psy260</td>
</tr>
<tr>
<td>Credit points</td>
<td>9.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>270 h</td>
</tr>
<tr>
<td>Used in course of study</td>
<td>Master Neurocognitive Psychology &gt; Mastermodule</td>
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</table>

#### Contact person
- Hans Colonius
- Jochem Rieger
- Christoph Siegfried Herrmann
- Stefan Debener
- Jalenur Özyurt
- Riklef Weerda

#### Entry requirements
Enrolment in Master's programme Neurocognitive Psychology.
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://www.uni-oldenburg.de/en/psychology/study-programme/master/documents/

**Language of instruction**
English

**Duration (semesters)**
1 Semester

**Module frequency**
unlimited

**Reference text**
Topics for projects will be presented in a colloquium at the end of the summer term.
Students can choose 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).

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

**Modulart**
Pflicht / Mandatory

**Lern-Lehrform / Type of program**
practical work and regular seminar meetings in the group where the project is performed

**Vorkenntnisse / Previous knowledge**
PLEASE NOTE: Many projects require knowledge of either EEG, fMRI, TBS, or HCI analysis! We strongly recommend to take either psy170: Neurophysiology, psy270: Functional Neuroimaging, psy280: Transcranial Brain Stimulation, or psy220 Human Computer Interaction prior to 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>
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</table>

<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>Seminar</td>
<td></td>
<td>2.00</td>
<td>WiSe</td>
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<tr>
<td>Practical</td>
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**Total time of attendance for the module**: 56 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: 
Module capacity: 20 (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, 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:

<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 summer term</td>
<td>Oral or written examination Bonus for active participation (e.g. presentations, creating study material for other participants, tandem learning or oral contributions)</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>
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<tr>
<td>Course type</td>
<td>Comment</td>
<td>SWS</td>
<td>Frequency</td>
<td>Workload attendance</td>
</tr>
<tr>
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</tr>
<tr>
<td>Seminar</td>
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<td>SuSe</td>
<td>14 h</td>
</tr>
<tr>
<td>Practical</td>
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<td>4.00</td>
<td>SuSe</td>
<td>56 h</td>
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**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>
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<tbody>
<tr>
<td>Module code</td>
<td>psy275</td>
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<tr>
<td>Credit points</td>
<td>6.0 KP</td>
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<tr>
<td>Workload</td>
<td>180 h (Attendance: 56 h. (4 SWS), reading and practising: 124 h., total: 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>• 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>
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<tr>
<td></td>
<td>+ data presentation &amp; discussion</td>
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<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>
<tr>
<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 |


<table>
<thead>
<tr>
<th>Links</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Language of instruction</td>
<td>English</td>
</tr>
<tr>
<td>Duration (semesters)</td>
<td>1 Semester</td>
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<tr>
<td>Module frequency</td>
<td>The module will be offered in the winter term, blocked in the first half (seven weeks).</td>
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<tr>
<td>Module capacity</td>
<td>40</td>
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<tr>
<td>Modulelevel</td>
<td>MM (Mastermodul / Master module)</td>
</tr>
<tr>
<td>Modulart</td>
<td>Wahlpflicht / Elective</td>
</tr>
</tbody>
</table>

| Lern-Lehrform / Type of program | Part 1: 1 seminar (1 SWS) |
|                                 | Part 2: 1 supervised exercise (3 SWS) |

<table>
<thead>
<tr>
<th>Vorkenntnisse / Previous knowledge</th>
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</thead>
<tbody>
<tr>
<td>Examination</td>
<td>Time of examination</td>
</tr>
<tr>
<td>Final exam of module</td>
<td>end of winter term</td>
</tr>
<tr>
<td>Course type</td>
<td>Comment</td>
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<tr>
<td>Seminar</td>
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<tr>
<td>Exercises</td>
<td>3.00</td>
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<tr>
<td>Total time of attendance for the module</td>
<td>56 h</td>
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</table>
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 on 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, tDCS, tACS, tRNS)
- 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 (artifact 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
Module capacity: 10

Reference text:
We strongly recommend to take either psy170, psy270, 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>
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<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
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</thead>
<tbody>
<tr>
<td>Final exam of module</td>
<td>during summer term</td>
<td>Oral presentation in the seminar.</td>
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<table>
<thead>
<tr>
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<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
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</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>2.00</td>
<td></td>
<td>SuSe</td>
<td>28 h</td>
</tr>
<tr>
<td>Seminar</td>
<td>2.00</td>
<td></td>
<td>SuSe</td>
<td>28 h</td>
</tr>
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**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>
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<tbody>
<tr>
<td>Module code</td>
<td>mam</td>
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<tr>
<td>Credit points</td>
<td>30.0 KP</td>
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<tr>
<td>Workload</td>
<td>900 h</td>
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<td></td>
<td>(attendance in the lab meetings: 28h (2 SWS); thesis work: 872 hours)</td>
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<tr>
<td>Used in course of study</td>
<td>- Master Neurocognitive Psychology &gt; Abschlussmodul</td>
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<tr>
<td>Contact person</td>
<td></td>
</tr>
<tr>
<td>Entry requirements</td>
<td>Enrolment in Master's programme Neurocognitive Psychology. Completion of at least 60 credit points in other modules. 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**

**Links**
Rules for external Master's theses are explained here: http://www.uni-oldenburg.de/en/psychology/study-programme/master/documents/

**Language of instruction**
English

**Duration (semesters)**
1 Semester

**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.

**Module level**
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**
- **Time of 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 |