psy170 - Neurophysiology

Module label: Neurophysiology
Module code: psy170
Credit points: 6.0 KP
Workload: 180 h
Used in course of study:
- Master's Programme Neurocognitive Psychology > Master module
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!

**Modullevel**

MM (Mastermodul / Master module)

**Modulart**

Wahlpflicht / Elective

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

Part 1: lecture; Part 2: theoretical-practical seminar; Part 3: theoretical-practical seminar; additional tutorial

**Vorkenntnisse / Previous knowledge**

<table>
<thead>
<tr>
<th>Examination Type of examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
<th>Time 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 module will be tested with a written exam of 2 h duration. Bonus for recording electroencephalographic data.</td>
<td></td>
</tr>
</tbody>
</table>

**Course type**

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theorie-Praxis-Seminar</td>
<td>2 semester hours per week in first half of the winter term.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 semester hours per week in second half of the winter term. 2 semester hours per week in summer term.</td>
<td></td>
<td></td>
<td></td>
<td></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**

| WiSe | 14 h |
| SuSe and WiSe | 42 h |
| SuSe | 56 h |