psy241 - Computation in Neuroscience

Module label: Computation in Neuroscience
Module code: psy241
Credit points: 6.0 KP
Workload: 180 h

Used in course of study:
- Master's Programme Neurocognitive Psychology > Master module

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: The module will be offered every winter term.
- Module capacity: unlimited
- Modullevel: 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:
Examination | Time of examination | Type of examination |
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Final exam of module | exam period at the end of the summer term | 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.

<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>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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<td>Exercises</td>
<td>1 semester hour per week for winter and summer term.</td>
<td>2.00</td>
<td>SuSe and WiSe</td>
<td>28 h</td>
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<td>Tutorial</td>
<td>2 semester hours per week in winter and summer term</td>
<td>0.00</td>
<td>SuSe and WiSe</td>
<td>0 h</td>
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**Total time of attendance for the module**

84 h