neu410 - Auditory Neuroscience

Module label
Auditory Neuroscience

Module code
neu410

Credit points
15.0 KP

Workload
450 h

Used in course of study
- Master's Programme Neuroscience > Research Modules

Contact person
- Module responsibility
  - Christine Köppl
- Authorized examiners
  - Alle hier genannten
- Module counseling
  - Georg Martin Klump
  - Jannis Hildebrandt

Entry requirements
- Neurosci. knowlg. Expt. methods
- Independent research
- Scient. literature
- Social skills
- Interdiscipl. knowlg.
  - Maths/Stats/Progr.
  - Data present./disc.
- Scientific English
- Ethics

Introduction to independent, experimental research in auditory sensory physiology. May serve as preparation for a Master thesis.

Upon successful completion of this course, students
- have profound knowledge on auditory sensory processing, including cochlear transduction mechanisms, central auditory processing and auditory psychophysics
- have basic knowledge of the large range of techniques used in auditory research
- are able to read and critically report to others on an original research paper in auditory neuroscience
- have in-depth knowledge on a specific research question in auditory neuroscience
- are able to discuss current hypotheses and controversies regarding their research question
- are able to perform experiments addressing their research topic and can describe the principles and the pros and cons of the experimental technique used
- are able to critically evaluate and discuss experimental results

Module contents
One week introductory block course "Fundamentals of Auditory Physiology", comprised of a lecture series and matching seminar that emphasizes discussion.

Topics:
- Hair cells: structure, transduction mechanism, receptor potential, synaptic transmission
- Basilar papilla / cochlea: structure, micromechanics, amplification; otoacoustic emissions
- Auditory nerve: phase locking, rate coding. Excitation patterns
- Ascending auditory pathways: wiring, principles of excitation/inhibition, examples of cellular/molecular specialisations
- Sound localisation in birds and mammals
- Central auditory processing: imaging techniques, auditory streams, cortex, primates
- Relation between psychophysics and neurophysiology

The introductory course is followed by 6 weeks of small-group laboratory-based projects, participating in the supervisor's ongoing research. This includes experimental work, data analysis, literature study, participation in the group seminar and in a poster presentation of concurrent Research Modules.

There are three options for the lab projects:
- Option 1: Cochlea and auditory brainstem (Köppl)
- Option 2: Auditory cortex (Hildebrandt)
- Option 3: Central auditory mechanisms (Klump)

Reader's advisory
About 20 selected original papers (selection varies)


Links

Language of instruction
English

Duration (semesters)
1 Semester

Module frequency
jährlich

Module capacity
unlimited

Reference text
Introductory block course will be held in the first week of winter term, lab component is flexible and subject to individual arrangement. Participation in a joint poster presentation of concurrent research modules is required to pass the module.

Modullevel
MM (Mastermodul)

Modulart
Wahlpflicht

Lern-/Lehrform / Type of program
### Vorkenntnisse / Previous knowledge

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<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>within 2 months after completion of experimental work</td>
<td>Internship report</td>
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<table>
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<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>
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<td>14 h</td>
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<tr>
<td>Seminar</td>
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<td>WiSe</td>
<td>112 h</td>
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**Total time of attendance for the module**: 140 h