**phy696 - Advanced Topics Speech and Audio Processing**

<table>
<thead>
<tr>
<th>Module label</th>
<th>Advanced Topics Speech and Audio Processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>phy696</td>
</tr>
<tr>
<td>Credit points</td>
<td>6.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>180 h (Attendance: 56 hrs, Self study: 124 hrs)</td>
</tr>
</tbody>
</table>

**Used in course of study**
- Master's Programme Engineering Physics > Schwerpunkt: Acoustics
- Master's Programme Engineering Physics > Schwerpunkt: Biomedical Physics

**Contact person**
- Module counseling
  - Simon Doclo

**Entry requirements**
- Basic principles of signal processing (preferably successfully completed the course Signal- und Systemtheorie and/or Blockpraktikum Digitale Signalverarbeitung)

**Skills to be acquired in this module**
The students will gain in-depth knowledge on the subjects' speech and audio processing. The practical part of the course mediates insight about important properties of the methods treated in a self-study approach, while the application and transfer of theoretical concepts to practical applications is gained by implementing algorithms on a computer.

**Module contents**
After reviewing the basic principles of speech processing and statistical signal processing (adaptive filtering, estimation theory), this course covers techniques and underlying algorithms that are essential in many modern-day speech communication and audio processing systems (e.g. mobile phones, hearing aids, headphones): acoustic echo and feedback cancellation, noise reduction, dereverberation, microphone and loudspeaker array processing, active noise control. During the exercises a typical hands-free speech communication or audio processing system is implemented (in Matlab).

**Reader's advisory**
- P. Vary, R. Martin: Digital Speech Transmission, Wiley, 2006;

**Links**
- English

**Language of instruction**
- English

**Duration (semesters)**
- 1 Semester

**Module frequency**
- unlimited

**Module capacity**
- unlimited (Mastermodul / Master module)

**Modulart**
- Wahlpflicht / Elective

**Lern-/Lehrform / Type of program**
- Lecture: 2hrs/week; practical work: 2hrs/week

**Vorkenntnisse / Previous knowledge**

**Examination**
- Time of examination
  - Exam or presentation or oral exam or homework or practical report

**Final exam of module**
- Lecture

**Course type**
- Lecture

**SWS**
- 4.00

**Frequency**
- SuSe or WiSe

**Workload attendance**
- 56 h