Learning Outcomes

After a successful participation of this course students hold advanced knowledge in the fields of bio-molecule detection, interfacing of nerve cells and prosthetic devices, mainly refereed to technical aspects. In that domains they are able to identify problem formulations and systematically develop solution concepts. In addition they are qualified to analyze and critically evaluate scientific approaches.

Content

The attendees will get an overview of the most important sensor principles for application in biology and biomedicine. The students will get an interdisciplinary point of view by combining theoretical knowledge of electrical engineering with requirements and limitations of industry-oriented technology and application-related biological issues.

The integrated lecture “CMOS Biosensors” considers working principles and CMOS-integration of different sensors for biomolecule detection, nerve cell interfacing, nerve tissue interfacing, and prothetic devices. Basic biological mechanisms necessary for the understanding of the function of the corresponding devices are introduced. Language of the integrated lecture is English.

Module Components

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Type</th>
<th>Number</th>
<th>Cycle</th>
<th>SWS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMOS-Biosensors</td>
<td>IV</td>
<td>0430 L 500</td>
<td>WS</td>
<td>4</td>
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Workload and Credit Points

<table>
<thead>
<tr>
<th>CMOS-Biosensors (Integrierte Veranstaltung)</th>
<th>Multiplier</th>
<th>Hours</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vor-/Nachbereitung</td>
<td>15.0</td>
<td>8.0h</td>
<td>120.0h</td>
</tr>
<tr>
<td>Präsenzzeit</td>
<td>15.0</td>
<td>4.0h</td>
<td>60.0h</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>180.0h</td>
</tr>
</tbody>
</table>

The Workload of the module sums up to 180.0 Hours. Therefore the module contains 6 Credits.

Description of Teaching and Learning Methods

Die Vorlesung wird begleitet durch 6 bis 7 Übungen, in denen ausgewählte Themen vertieft werden.

The lecture is accompanied by 6 to 7 tutorials where selected topics are covered in depth. The attendees will have the possibility to visit the chair’s laboratories and to learn about recent project work in close conjunction with the lecture’s topics.

Requirements for participation and examination

Desirable prerequisites for participation in the courses:

Voraussetzung für die Teilnahme sind elektrotechnische und halbleitertechnische, teilweise auch schaltungstechnische Grundlagenkenntnisse aus dem Bachelor-Studiengang Elektrotechnik.

Sound acquirement of basics of electrical and semiconductor engineering on a Bachelor-level are required, knowledge of circuit design is advantageous.

Mandatory requirements for the module test application:

No information

Module completion

<table>
<thead>
<tr>
<th>Grading</th>
<th>Type of exam</th>
<th>Language</th>
<th>Duration/Extent</th>
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</thead>
<tbody>
<tr>
<td>graded</td>
<td>Oral exam</td>
<td>English</td>
<td>30-45 min</td>
</tr>
</tbody>
</table>

Duration of the Module
This module can be completed in one semester.

**Maximum Number of Participants**
The maximum capacity of students is 15

**Registration Procedures**
Die Anmeldung zur Modulprüfung erfolgt über QISPOS. Aktuelle Informationen zur Veranstaltung und zur Anmeldung: http://www.se.tu-berlin.de. Für Informationen zur Veranstaltung bitte auch im entsprechenden ISIS-Kurs einschreiben!

Enrollment for the examination takes place through QISPOS. For recent information to the lecture and the enrollment please visit also http://www.se.tu-berlin.de. For information to the lecture please also subscribe to the corresponding ISIS-course!

**Recommended reading, Lecture notes**

<table>
<thead>
<tr>
<th>Lecture notes:</th>
<th>Electronical lecture notes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>available</td>
<td>unavailable</td>
</tr>
</tbody>
</table>

**Assigned Degree Programs**

This module version is used in the following module lists:

- **Computer Engineering (Master of Science)**
  - StuPO 2015

- **Elektrotechnik (Master of Science)**
  - StuPO 2015

**Miscellaneous**

No information