inf308 - Microrobotics II

Module label: Microrobotics II
Module code: inf308
Credit points: 6.0 KP
Workload: 180 h

Used in course of study:
- Master's Programme Computing Science > Nicht Informatik
- Master's Programme Computing Science > Technische Informatik
- Master's Programme Embedded Systems and Microrobotics > Akzentsetzungsmodul
- Master's Programme Engineering of Socio-Technical Systems > Embedded Brain Computer Interaction
- Master's Programme Engineering of Socio-Technical Systems > Human-Computer Interaction
- Master's Programme Engineering of Socio-Technical Systems > Systems Engineering
- Master's Programme Engineering Physics > Schwerpunkt: Laser und Optik

Contact person
Module responsibility:
- Sergei Fatikow
- Die im Modul Lehrenden

Authorized examiners:
- Sergei Fatikow
- Die im Modul Lehrenden

Entry requirements
Skills to be acquired in this module:

After having given an established introduction in the module “Microrobotics and Microsystem Technology” this lecture offers a further specialisation in microrobotics. Within the course, all relevant areas (among others the research topics of the division “Microrobotics and Control Engineering (AMiR)”) will be presented and analysed. The student will be provided with an insight into current research projects of AMiR and of other research institutes of microrobotics worldwide; here mainly the requirements of industry to microrobots will be discussed. The lecture will be enhanced by practical courses in the research laboratories of AMiR.

Professional competence
The students:

- name and recognise the basic concepts of nanotechnology, in particular, micro- and nanorobotics approaches
- differentiate the development, control and application of micro- and nanorobotics systems
- implement and design application-specific micro- and nanorobotics systems

Methodological competence
The students:

- transfer their control engineering and image processing abilities on interdisciplinary problems
- transfer their hands-on experience to develop controls and applications of microrobotic systems on new tasks

Social competence
The students:

- work in a team

Self-competence
The students:

- reflect their problem-solving behaviour and use hands-on experience to develop, control and application of microrobotics

Module contents
Smart and versatile microrobots; microactuators (piezo-, ferrofluid- and SMA-actuators) for microrobots; real-time image processing in the micro world (SEM, optical microscopy); micro force sensors and tactile sensors for microrobots; microrobot control systems, e.g. neural networks and fuzzy logic; haptic interface for the control of microrobots; neural speech interface for the control of
microrobots; robot-based micro- and nanohandling (SEM, optical microscopy); applications: microassembly, nano-testing, cell handling; Micro Air Vehicles (MAVs); multi-robot systems: team behavior, communication, control issues

**Reader’s advisory**

- Lecture notes (can be obtained in secretariate, A1-3-303)

**Links**

**Languages of instruction**
- German, English

**Duration (semesters)**
- 1 Semester

**Module frequency**
- once a year

**Module capacity**
- unlimited

**Modullevel**
- AS (Akzentsetzung / Accentuation)

**Modulart**
- Pflicht o. Wahlpflicht / compulsory or optional

**Lern-/Lehrform / Type of program**
- V+Ü

**Vorkenntnisse / Previous knowledge**
- Moduls Microrobotics and Microsystem Technology

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<td>Final exam of module</td>
<td>At the end of the lecture period</td>
<td>Oral Exam and exercises</td>
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<td>Exercises</td>
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**Total time of attendance for the module**

- 56 h