inf308 - 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
- Sergej Fatikow
- Die im Modul Lehrenden

Authorized examiners
- Sergej 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
Module level: AS (Akzentsetzung / Accentuation)
Modular: 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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<th>Time of examination</th>
<th>Type of examination</th>
<th>Oral Exam and exercises</th>
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<tbody>
<tr>
<td>Final exam of module</td>
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<th>Workload attendance</th>
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Total time of attendance for the module: 56 h