# inf307 - Robotics

<table>
<thead>
<tr>
<th>Module label</th>
<th>Robotics</th>
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<tr>
<td>Module code</td>
<td>inf307</td>
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<tr>
<td>Credit points</td>
<td>6.0 KP</td>
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<tr>
<td>Workload</td>
<td>180 h</td>
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<tr>
<td>Used in course of study</td>
<td></td>
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<tr>
<td>Master's Programme Computing Science &gt; Nicht Informatik</td>
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<tr>
<td>Master's Programme Computing Science &gt; Technische Informatik</td>
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<tr>
<td>Master's Programme Embedded Systems and Microrobotics &gt; Akzentsetzungsmodule</td>
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<tr>
<td>Master's Programme Engineering of Socio-Technical Systems &gt; Embedded Brain Computer Interaction</td>
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<tr>
<td>Master's Programme Engineering of Socio-Technical Systems &gt; Human-Computer Interaction</td>
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<td>Master's Programme Engineering of Socio-Technical Systems &gt; Systems Engineering</td>
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## Contact person

### Module responsibility

- Andreas Hein
- Die im Modul Lehrenden

### Authorized examiners

- Die im Modul Lehrenden
- Andreas Hein

## Entry requirements

### Skills to be acquired in this module

#### Professional competence

The students:

- Name and know the functions and applications of robot systems
- Characterise the basic concepts to program robot systems
- Differentiate between the interaction of mechanical, electrical and software components

#### Methodological competence

The students:

- Define characteristics and components of robot systems for a specific application
- Design and implement robot system sub-components
- Design and parameterise simple control structures
- Plan the application of robot systems and derive the requirements
- Model electrical and mechanical systems
- Develop and realise simple robot systems

#### Social competence

The students:

- Solve robot systems problems in team work

#### Self-competence

The students:

- Reflect their solutions in reference to robot system methods

## Module contents

- Integration in production plants / aims / subsystems
- Architectures / classifications (classification of robots)
- Robot components + Computer systems for programming
  - PA-10
  - Lego Mindstorms
- Basics of kinematics
  - Coordinate transformation, homogeneous coordinates, Coordinate transitions
  - Kinematic equation systems, transformation of vectors
- Kinematic
  - Joint types (manipulators) / Wheels, TCP
- Denavit-Hartenberg-Transformation
- Forward calculation
- Backward calculation
- Sensors
  - General properties of sensors, parameter
  - Simple optical position sensors
  - Inductive-, capacitive- und ultrasonic-sensors
  - Distance sensors (laser scanner, triangulation sensors)
  - Force sensors
  - Sensor data preparation
- Planning / Regulation
  - Overall regulation approach, terms, process- and control functions, PID-controller
  - Planning concepts and approaches (On-Line, Off-Line), planning processes, construction and path planning
- Actuators

Reader’s advisory

essential:
lecture nodes

recommended:

secondary literature:

Links
Languages of instruction
German, English
Duration (semesters)
1 Semester
Module frequency
once a year
Module capacity
unlimited
Modulart
AS (Akzentsetzung / Accentuation)
Modullevel
Pflicht o. Wahlpflicht / compulsory or optional
Lern-/Lehrform / Type of program
V+U
Vorkenntnisse / Previous knowledge

Examination Time of examination Type of examination
Final exam of module At the end of the lecture period Portfolio: Hands-on exercises, report, and written or oral exam

Course type Comment SWS Frequency Workload attendance
Lecture 3.00 SuSe 42 h
Exercises 1.00 SuSe 14 h
Total time of attendance for the module 56 h