inf307 - Robotics

Module label: Robotics
Module code: inf307
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 > Akzentsetzungsmodule
- 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

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)

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

Vorkenntnisse / Previous knowledge

Examination
Time of examination
- At the end of the lecture period
Type of examination
- 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