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 > 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

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
Modulelevel
AS (Akzentsetzung / Accentuation)
Modulart
Pflicht o. Wahlpflicht / compulsory or optional
Lern-/Lehrform / Type of program
V+U
Vorkenntnisse / Previous knowledge

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

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