### Module title
Robotics 2

### Abbreviation
10-I=RO2-152-m01

### Module coordinator
holder of the Chair of Computer Science VII

### Module offered by
Institute of Computer Science

### ECTS
8

### Method of grading
numerical grade

### Only after succ. compl. of module(s)
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### Duration
1 semester

### Module level
graduate

### Other prerequisites
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### Contents
Foundations of dynamic systems, controllability and observability, controller design through pole assignment: feedback and feed-forward, state observer, feedback with state observer, time discrete systems, stochastic systems: foundations of stochastics, random processes, stochastic dynamic systems, Kalman filter: derivation, initialising, application examples, problems of Kalman filters, extended Kalman filter.

### Intended learning outcomes
The students master all fundamentals that are necessary to understand Kalman filters and their use in applications of robotics. The students possess a knowledge of advanced controller and observer methods and recognise the connections between the dual pairs controllability - observability as well as controller design and observer design. They also recognise the relationship between the Kalman filter as a state estimator and an observer.

### Courses
(type, number of weekly contact hours, language — if other than German)

V (4) + Ü (2)

### Method of assessment
(type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (approx. 60 to 90 minutes)
creditable for bonus

### Allocation of places
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### Additional information
Focuses available for students of the Master’s programme Informatik (Computer Science, 120 ECTS credits):
IT, ES, LR

### Workload
240 h

### Teaching cycle
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### Referred to in LPO I (examination regulations for teaching-degree programmes)
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### Module appears in
- Master's degree (1 major) Space Science and Technology (2015)
- First state examination for the teaching degree Gymnasium Computer Science (2015)
- Master's degree (1 major) Computer Science (2016)
- Master's degree (1 major) Mathematics (2016)
- Master's degree (1 major) Computational Mathematics (2016)
- Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
- Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
- Master's degree (1 major) Computer Science (2017)
- Master's degree (1 major) Computer Science (2018)
- Master's degree (1 major) Computational Mathematics (2019)
| Master's degree (1 major) Mathematics (2019) |
| Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) |
| Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) |