Module title	Abbreviation
Advanced Sensory Systems and Sensor Data Processing	10-LURI=ASS-202-m01

Module coordinator	Module offered by
holder of the Chair of Computer Science XVII	Institute of Computer Science

ECTS	Method of grading	Only after succ. compl. of module(s)	
5	numerical grade	--	

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Advanced automation systems need instrumentation concepts with proprioceptive and exteroceptive sensors. The sensors can be active or passive and may be enclosed into an embedded system. Only complex sensor systems and clever sensor data processing procedures ensure the tasks of satellite systems are performed in a reliable fashion. After discussing in detail state-of-the-art sensors and sensor systems, the course focuses on sensor data processing for in orbit and for planetary applications.

Intended learning outcomes

Students will master modern sensor data acquisition systems with embedded processing and several advanced data processing concepts, like sensor data interpretation. Advanced state estimation methods will be discussed within localization and mapping and students will have to deal with linear, non-linear filters (Kalman filter, extended Kalman filter, Unscented Kalman Filter, Particle filter, etc.). Furthermore, students should be able to put novel research strands in this area like machine learning concepts into a scientific and technological perspective and should be aware about the advantages and disadvantages.

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

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Module taught in: German and/or English

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. 90 to 120 minutes)
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
Language of assessment: German and/or English
creditable for bonus

Allocation of places

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Additional information

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Workload

150 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) Aerospace Computer Science (2020)
Master's degree (1 major) Aerospace Computer Science (2021)
Master's degree (1 major) Aerospace Computer Science (2023)