TECHNISCHE HOCHSCHULE LÜBECK

Module: Control Systems Basics

Level	Bachelor	**Short Name**	CSB
Responsible Lecturers	Korff, Alexander Prof. Dr.		
Department, Facility	Electrical Engineering and Computer Science		
Course of Studies	Elektrotechnik - Energiesysteme und Automation, Bachelor		
Compulsory/elective	Compulsory	**ECTS Credit Points**	5
Semester of Studies	5	**Semester Hours per Week**	4
Length (semesters)	1	**Workload (hours)**	150
Frequency	WiSe	**Presence Hours**	60
Teaching Language	English	**Self-Study Hours**	90

The following section is filled only if there is **exactly one** module-concluding exam.

Exam Type	Written Exam	**Exam Language**	English
Exam Length (minutes)	120	**Exam Grading System**	One-third Grades
Learning Outcomes	After hearing the first module „Control Systems Basics" the students are able to: • assess the basic possibilities and limits of mechatronic systems and evaluate the influence of certain elements/components on their behaviour • are able to independently orientate theirselfes in the field taught and evaluate and classify new research and technologies • apply the fundamental high level methods and tools to plan/implement the development of for example a simple mobile robotic/mechtronic systems • assess which advantages/disadvantages and opportunities/risks result from for example mobile systems/mobile robotics in relation to our society and which obligations derive from this		
Participation Prerequisites	Knowledge of lectures in 1. – 3. semester		

The previous section is filled only if there is **exactly one** module-concluding exam.

Consideration of Gender and Diversity Issues	✔ Use of gender-neutral language (THL standard) ✘ Target group specific adjustment of didactic methods ✘ Making subject diversity visible (female researchers, cultures etc.)
Applicability	
Remarks	

Module Course: Control Systems Basics (Lecture)

(of Module: Control Systems Basics)

Course Type	Lecture	**Form of Learning**	Presence
Mandatory Attendance	yes	**ECTS Credit Points**	3
Participation Limit		**Semester Hours per Week**	3
Group Size	12	**Workload (hours)**	90
Teaching Language	English	**Presence Hours**	45
Study Achievements ("Studienleistung", SL)		**Self-Study Hours**	45
SL Length (minutes)		**SL Grading System**	

The following section is filled only if there is a course-specific exam.

Exam Type		**Exam Language**	
Exam Length (minutes)		**Exam Grading System**	
Learning Outcomes			
Participation Prerequisites			

The previous section is filled only if there is a course-specific exam.

Contents	The lecture gives an overview of the main challenges, approaches and methods in the field of mobile systems and mobile robotics. After an introduction (classification, overview of the different mobile systems), the following topics will be covered: • Sensors and actuators and manipulation for mobile systems, • localization and navigation, • the specifics of communication • as well as energy supply for mobile systems, • aspects of security, • the Robotic Operating System ROS and its possibilities, • and the architecture of mobile systems.
Literature	[1] Peter Corke. Robotic Vision: Fundamental Algorithms in MATLAB, Springer-Verlag, 2022 [2] Peter Corke. Robotics and Control: Fundamental Algorithms in MATLAB, Springer-Verlag, 2022 [3] https://clearpathrobotics.com/turtlebot-4/ [4] https://www.ros.org/
Remarks	

Module Course: Control Systems Basics (Lab)

(of Module: Control Systems Basics)

Course Type	Practical Training	**Form of Learning**	Presence
Mandatory Attendance	no	**ECTS Credit Points**	2
Participation Limit		**Semester Hours per Week**	1
Group Size		**Workload (hours)**	60
Teaching Language	English	**Presence Hours**	15
Study Achievements ("Studienleistung", SL)		**Self-Study Hours**	45
SL Length (minutes)		**SL Grading System**	

The following section is filled only if there is a course-specific exam.

Exam Type		**Exam Language**	
Exam Length (minutes)		**Exam Grading System**	
Learning Outcomes			
Participation Prerequisites			

The previous section is filled only if there is a course-specific exam.

Contents	In the practical course, the methods learned in the lecture are applied practically within the framework of a design of a mobile robot system. The partial/results are regularly presented and discussed in the group.
Literature	[1] Peter Corke. Robotic Vision: Fundamental Algorithms in MATLAB, Springer-Verlag, 2022
	[2] Peter Corke. Robotics and Control: Fundamental Algorithms in MATLAB, Springer-Verlag, 2022
	[3] https://clearpathrobotics.com/turtlebot-4/
	[4] https://www.ros.org/
Remarks	