

Modulbezeichnung (Kürzel)	Robotic Systems (ROSY)	
Modulbezeichnung (eng.)	Robotic Systems	
Semester (Häufigkeit)	WPM (nach Bedarf)	
ECTS-Punkte (Dauer)	5 (1 Semester)	
Art	Wahlpflichtmodul Zertifikat Industrial Cyber-Physical Systems und Zertifikat Informationsverarbeitung für cyber-physische Systeme	
Sprache(n)	Englisch	
Studentische Arbeitsbelastung	60 h Kontaktzeit + 90 h Selbststudium	
Voraussetzungen (laut MPO)		
Empf. Voraussetzungen		
Verwendbarkeit	MII	
Prüfungsform und -dauer	Klausur 1,5 h oder mündliche Prüfung	
Lehr- und Lernmethoden	Vorlesung, Praktikum	
Modulverantwortliche(r)	A. W. Colombo	
Qualifikationsziele		
<p>The students understand and are able to describe the mechatronics and SW structure of robots. They have know-how about robotic applications, centered around industrial processes. In these areas they gain knowledge about both, the hardware components of robots, their many sensors, actuators, and physical configurations, as well as the algorithmic kinematics and dynamics and software components required to drive them. The students become familiar with the periphery of a standard industrial robotic cell, and its interaction in the complete process environment. Knowledge about standard SW-Interfaces to integrate robots in an Industrial Cyber-Physical System are acquired by learning the robot as a CPS-component within a RAMI4.0-compliant automation architecture. The students are to gain an insight in the emerging trends in the fields of robotics, Man-Machine Interaction, Light Weight Robots and the widening fields of robotics in an industrialized nation, including Medical Robotics, Agricultural Robots, Search and Rescue Robots and more.</p>		
Lehrinhalte		
<p>Overview of different types of robots including structural and behavioral specifications: working-space, energy-sources, etc. Introduction to Robotic Kinematics (forward and backward), Robotic Dynamics. HW- and SW- Interfaces for integrating the robot in an industrial flexible cell. Selection of different types of Sensors, Actuators and Grippers as well as their application domains. Overview of current and emerging fields for robotics: Industrial Robotics, Medical Robotics, Delivery Robotics, Agricultural Robotics. Overview of traditional industrial robotized processes: welding, cutting, cleaning, palletizing, tendering, assembly/disassembly: which kind of robot and energy source is recommendable for each kind of application. SW-Communication Interfaces for connecting a robot to a ICPS-based service cloud. Introduction to ROS, IROS, SKIROS (Robot Operating Systems). Combining seminars and practical projects, contents will be adapted to the latest outcomes of research and Innovation projects of the I2AR Institute.</p>		
Literatur		
<p>John J Craig: Introduction to Robotics, Mechanics and Control. Prentice Hall 2003. Heimann, B., Gerth, G. und Popp, K.: Mechatronik, 3. Auflage, Hanser 2007. Roddeck, W.: Einführung in die Mechatronik, Teubner, Stuttgart, 1997. Vogel, J.: Elektrische Antriebe, Hüthig, Berlin, 1988. Steven M. LaValle, Planning Algorithms, Cambridge University Press, 2006</p>		
Lehrveranstaltungen		
Dozenten/-innen	Titel der Lehrveranstaltung	SWS
G. Kane	Robotic Systems 1	2

A. W. Colombo	Robotic Systems 2	2
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