Syllabus

Course Description

Course Title	Robot Control
Course Code	42417
Course Title Additional	
Scientific-Disciplinary Sector	IINF-04/A
Language	German
Degree Course	Bachelor in Electronics and Cyber-Physical Systems Engineering
Other Degree Courses (Loaned)	
Lecturers	Prof. Dr. Angelika Peer, Angelika.Peer@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/38684
Teaching Assistant	
Semester	Second semester
Course Year/s	3
CP	6
Teaching Hours	36
Lab Hours	24
Individual Study Hours	90
Planned Office Hours	18
Contents Summary	1. Robot kinematics and dynamics 2. Trajectory planning 3. Motion control 4. Interaction control 5. Vision-based control 6. Remote control 7. Computer-aided simulation and design
Course Topics	The lecture introduces to topics of robot modelling in terms of kinematics and dynamics, trajectory planning and the control of robot manipulators with focus on motion control in joint and task

	space, interaction control, and vision-based control. Matlab/Simulink is introduced as computer-aided simulation and design tool to support the controller analysis and design.
Keywords	Robot kinematics and dynamics; Trajectory planning; Motion control; Interaction control; Vision-based control; Computer-aided simulation and design
Recommended Prerequisites	
Propaedeutic Courses	
Teaching Format	The lessons are divided into frontal classroom lessons, and exercises to be solved alone or in a group with the help of Matlab/Simulink.
Mandatory Attendance	recommended
Specific Educational Objectives and Learning Outcomes	Knowledge and understanding 1. Knowledge and understanding in the field of control of robot manipulators Applying knowledge and understanding 2. Ability to apply knowledge for solving given problems, including solving them with numerical data and with the help of software packages like Matlab/Simulink. Making judgements 3. Ability to judge plausibility of results. Communication skills 4. Maturing of technical-scientific terminology. Ability to learn 5. Learning skills to independently study and apply methods of robot control for specific applications beyond topics covered in this lecture.
Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	Formative assessment: In-class exercises (continuously as part of course accompanying exercises) Summative assessment: oral exam of approx. 30 minutes
Evaluation Criteria	• Clarity and correctness of answers; • Soundness of the sketched approach to address a problem and the single steps involved; • Ability to summarize, evaluate, and establish relationships between topics;

	• Correct usage of terminology
Required Readings	Blackboard and slides
Supplementary Readings	Introduction to Robotics – Mechanics and Control, John Craig, Pearson, 2018. Robotics – Modelling, Planning and Control, Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, Giuseppe Oriolo, Springer, 2009. Robot Modeling and Control, Mark W. Spong, Seth Hutchinson, M. Vidyasagar, Wiley, 2006. Modern Robotics – Mechanics, Planning and Control, Kevin M. Lynch, Frank C. Park, Cambridge, 2018. Modelling, Indentification & Control of Robots, W. Khalil & E. Dombre, Kogan Page Science, 2004. Robotics, Vision and Control, Peter Corke, Springer, 2011.
Further Information	Software used: Matlab/Simulink
Sustainable Development Goals (SDGs)	Quality education