

Syllabus

Course description

Course title	Introduction to Robot Control
Course code	43079
Scientific sector	ING-INF/04
Degree	Bachelor in Industrial and Mechanical Engineering
Semester	I
Year	III
Academic Year	2020/21
Credits	6
Modular	//

Total lecturing hours	36
Total lab hours	0
Total exercise hours	24
Attendance	Recommended
Prerequisites	Lectures and exercises of Mathematical Analysis I and II, Geometry, Physics I, Mechanics of Machinery
Course page	

Specific educational objectives	The student should understand the basic principles of the theory of the control of robot manipulators.
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Lecturer	Prof. Angelika Peer, e-mail: angelika.peer@unibz.it , https://www.unibz.it/de/faculties/sciencetechnology/academic-staff/person/38684-angelika-peer
Scientific sector of the lecturer	ING-INF/04 – AUTOMATION
Teaching language	English
Office hours	After consultation and agreement with lecturer
Teaching assistant (if any)	-
Office hours	-
List of topics covered	<ol style="list-style-type: none"> 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
Teaching format	The lessons are divided into theoretical classroom lessons, and exercises using blackboard and slides as well as exercises.

Learning outcomes (ILOs)	<p>The learning outcomes need to refer to the Dublin Descriptors:</p> <p><u>Knowledge and understanding</u> Knowledge and understanding in the field of:</p>
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	<p>1. Theory of control of robot manipulators</p> <p><u>Applying knowledge and understanding</u></p> <p>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.</p> <p><u>Making judgements</u></p> <p>3. Ability to judge plausibility of results.</p> <p><u>Communication skills</u></p> <p>4. Maturing of technical-scientific terminology.</p> <p><u>Ability to learn</u></p> <p>5. Learning skills to independently study and apply methods of systems and control for specific applications beyond topics covered in this lecture.</p>
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Assessment	Formative assessment			
	Form	Length /duration	ILOs assessed	
	In-class exercises	Continuously as part of course-accompanying exercises	1-5	
	Summative assessment			
	Form	%	Length /duration	ILOs assessed
	Oral	100	30 minutes	1-5
Assessment language	English			
Evaluation criteria and criteria for awarding marks	<p>Judged will be:</p> <ul style="list-style-type: none"> the correctness of the approach and the mathematical steps of the solution, the calculation of numerical results; the correctness of the provided answers and arguments presented and the terminology used. 			

Required readings	Blackboard and slides
Supplementary readings	<p>Introduction to Robotics – Mechanics and Control, John Craig, Pearson, 2018</p> <p>Robotics – Modelling, Planning and Control, Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, Giuseppe Oriolo, Springer, 2009.</p> <p>Robot Modeling and Control, Mark W. Spong, Seth Hutchinson, M. Vidyasagar, Wiley, 2006.</p> <p>Modern Robotics – Mechanics, Planning and Control,</p>

Kevin M. Lynch, Frank C. Park, Cambridge, 2018.

Modelling, Identification & Control of Robots, W. Khalil & E. Dombre, Kogan Page Science, 2004

Robotics, Vision and Control, Peter Corke, Springer, 2011