Freie Universität Bozen
Libera Università di Bolzano
Università Liedia de Bulsan

Syllabus
Course description

Course title	Systems and Control Lab
Course code	42167
Scientific sector	ING-INF/04
Degree	Bachelor in Industrial and Mechanical Engineering
Semester	II
Year	III
Academic Year	2020-21
Credits	6
Modular	

Total lecturing hours	
Total lab hours	
Total exercise hours	60
Attendance	Recommended
Prerequisites	Lectures and exercises of Mathematical Analysis I and II, Geometry, and Physics I
Course page	

Specific educational objectives	The student should understand the basic principles of the theory of modelling and control of linear systems and their practical implementation is simulation and with a real robot.

Lecturer	Marco Frego, PhD, email : marco.frego@unibz.it https://www.unibz.it/en/faculties/sciencetechnology/academic-staff/person/44497-marco-frego
Scientific sector of the lecturer	ING-INF/04 – AUTOMATION
Teaching language	English
Office hours	After agreement with the lecturer
Teaching assistant (if any)	
Office hours	
List of topics covered	1. Introduction to Matlab 2. Basics of Simulink 3. Dynamic systems in the frequency domain 4. Application to robot control in the lab experiences
Teaching format	The lessons are divided into theoretical online lessons, exercises on the blackboard and exercises with simulation software, hand-on experience in the lab with robots.

Learning outcomes (ILOs)	The learning outcomes need to refer to the Dublin Descriptors:

	Knowledge and understanding 1. Matlab/Simulink computational tools and theory and practice of linear control systems. Applying knowledge and understanding 2. Application of Matlab and Simulink to control problems, in simulation and with the robotic systems. Making judgements 3. Ability to judge plausibility of results. Communication skills 4. Maturing of technical-scientific terminology. Ability to learn 5. Use the skills learnt in the course to autonomously extend the knowledge of programming and implementing control systems.

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
Interactive	100	About 1h	1-5

Assessment language	English
Evaluation criteria and criteria for awarding marks	The exam includes exercises to be solved with Matlab and Simulink, involving mathematical methods for control problems. Judged will be the formal and methodological correctness of the answers, the computations and their presentation and analysis.

Required readings	Lecture Material
Supplementary readings	There is a vast literature on Matlab/Simulink, Any book that covers the basics will work. Some suggestions: A MATLAB Primer for Technical Programming in Materials Science and Engineering - Leonid Burstein - Woodhead Publishing Elsevier - 2020 MATLAB A Practical Introduction to Programming and Problem Solving - Stormy Attaway - Second Edition - Butterworth-Heinemann Elsevier – 2012 Angermann, Rau, Beuschel, Wohlfarth - MATLAB, Simulink, Stateflow - De Gruyter (in German) 9th ed. 2017 Control Systems Engineering – Global Edition, Norman S. Nise, Wiley, 2017 (based on 7th edition from 2015).